United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Ford County, Illinois

How To Use This Soil Survey

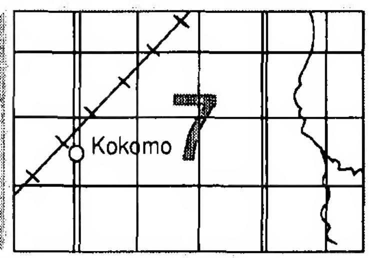
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

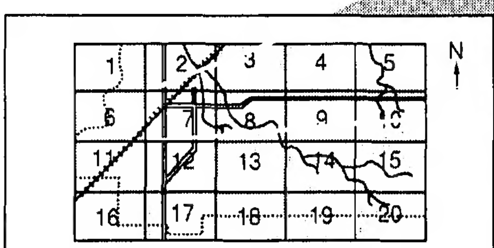
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



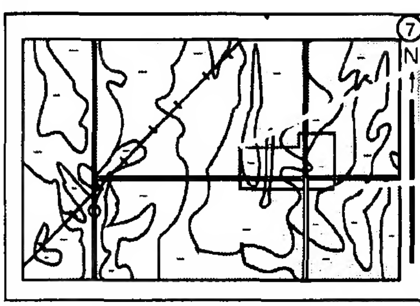
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

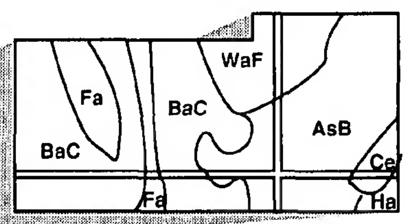


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1984. Soil names and descriptions were approved in February 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1984. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Ford County Soil and Water Conservation District. The cost was shared by the Ford County Board.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 128.

Cover: A system of grassed, parallel tile outlet terraces on Elliott soils. Terraces and a conservation tillage system help to control erosion on these soils.

Contents

Issued June 1990

Index to Map Units

Summary of Tables

Foreword

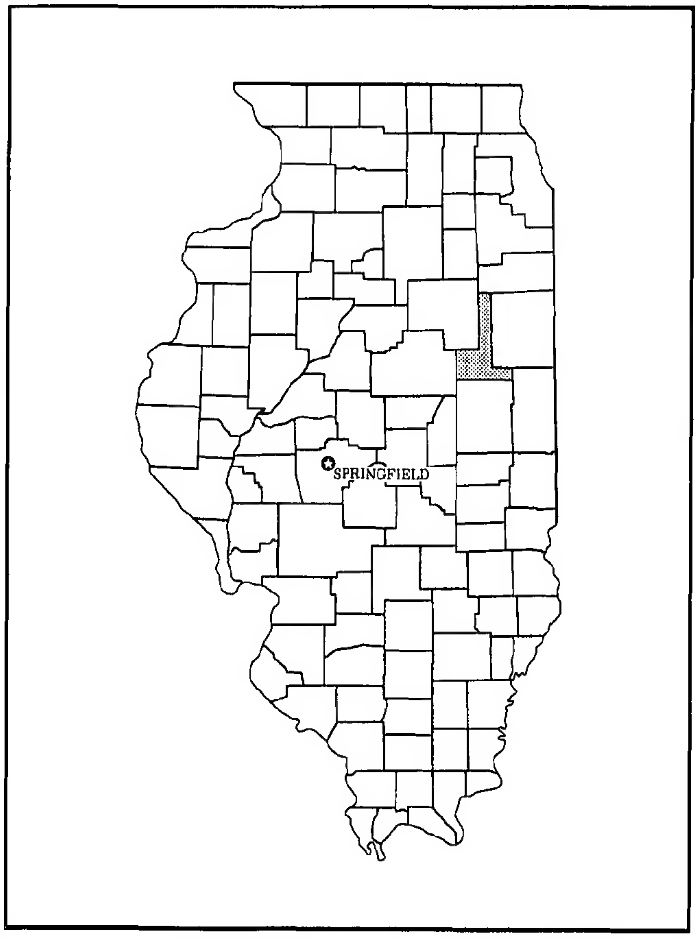
This soil survey contains information that can be used in land-planning programs in Ford County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes
State Conservationist
Soil Conservation Service



Location of Ford County in Illinois.

Soil Survey of
Ford County, Illinois

By Donald J. Fehrenbacher, Soil Conservation Service

Fieldwork by Donald J. Fehrenbacher, Bruce R. Putman, and William M. Teater, Soil Conservation Service, and Richard J. Schantz and Jon A. Stika, Ford County

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
Illinois Agricultural Experiment Station

FORD COUNTY is in the east-central part of Illinois. It has an area of 312,320 acres, or about 490 square miles. It is bordered on the south by Champaign County, on the west by Livingston and McLean Counties, on the north by Kankakee, Livingston, and Iroquois Counties, and on the east by Iroquois and Vermilion Counties. In 1980, the population was 15,265 *(5)*. Paxton is the county seat.

This soil survey supersedes the soil survey of Ford County published in 1941 *(7)*. It provides additional information and more recent interpretations and contains larger maps that show the soils in greater detail.

General Nature of the County

This section provides general information about the climate, history and development, transportation facilities, and relief, physiography, and drainage in Ford County.

Climate

Prepared by the Illinois State Water Survey, Champaign, Illinois.

Ford County is cold in winter and hot in summer. Winter precipitation, frequently snow, results in a good accumulation of soil moisture by spring and minimizes drought in summer on most soils. The normal annual precipitation is adequate for all crops that are suited to the temperature and length of the growing season in the county.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Kankakee in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In January the average temperature is 22.5 degrees F, and the average January minimum temperature is 14.2 degrees. The lowest temperature on record, which occurred at Kankakee on January 28, 1963, is 21 degrees. In summer the average temperature is 72.5 degrees, and the average monthly maximum temperature is 83.9 degrees. The highest recorded temperature, which occurred at Kankakee on July 20, 1953, is 101 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 35 inches. Of this, about 23 inches, or 65 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The

heaviest 1-day rainfall during the period of record was 8.43 inches at Kankakee on July 13, 1957.

The average seasonal snowfall is 24.8 inches. The greatest snow depth at any one time during the period of record was 30 inches. The number of days of the year that have at least 1 inch of snow on the ground varies greatly from year to year.

History and Development

The area now known as Ford County was originally inhabited by native Americans of the Illinois, Kickapoo, Miami, and Potawatomi Tribes. The first permanent European settlements were established in the early 1800's.

Ford County was named after Thomas Ford, the seventh governor of Illinois. On February 17, 1859, it was established as the last county in the state *(4)*. The county seat was originally Prairie City, which was renamed Prospect City. This name was changed to Paxton in the hope of attracting Sir Paxton of England to settle there.

Farming has been the most important enterprise in Ford County. In 1981, crops were produced on about 290,000 acres. The average size farm was about 390 acres *(5)*. Corn was grown on 147,000 acres, soybeans on 132,000 acres, wheat on 2,200 acres, oats on 18,000 acres, and hay on 3,800 acres. In 1981, the number of livestock in Ford County totaled 9,200 head of cattle, 33,600 hogs, 1,400 head of sheep, and 15,100 laying hens *(5)*.

Transportation Facilities

Ford County has a well developed transportation system of highways and railroads. U.S. 45 and Interstate 57 pass through the county near Paxton. Illinois Routes 115 and 47 are major north-south routes, and Illinois Routes 9 and 116 are major east-west routes. Paxton and Gibson City both have airports, and many towns are served by railroads.

A number of industries are located in Ford County. The principal manufactured products are electronic components, industrial cooling systems, and agricultural truck equipment.

Relief, Physiography, and Drainage

Ford County is underlain by three major types of bedrock—(1) Silurian dolomite in the central part of the county, (2) Devonian shale and limestone in the Paxton area, and (3) Pennsylvanian sandstone north of Roberts.

The material over the bedrock was deposited during three major glacial periods. These were the Kansan, Illinoian, and Wisconsinan Glaciations, the last of which had the most influence. The thickness of these deposits ranges from 50 to 400 feet, and the maximum thickness is in the Paxton area *(13)*. These deposits are glacial till, a material compacted by the weight of the ice sheet; lacustrine material of silt loam to silty clay texture that settled out in still lake water; and sandy beach deposits from glacial Lake Watseka. The glacial lake formed when the Chatsworth Moraine blocked the flow of meltwater from the glaciers.

Relief in Ford County was caused by differences in the thickness of deposits left by the most recent glacier. The highest feature in the county is in an area on the Gifford Moraine southeast of Sibley, reaching an elevation of 870 feet above sea level. The lowest elevation is about 650 feet, located in the glacial lake plain area just north of Piper City.

The watershed divide between the Illinois and Wabash Rivers runs through the central part of Ford County. Prairie Creek, Spring Creek, Pigeon Creek, the East and West Branches of the Middle Fork Vermilion River, and the Sangamon River drain southeast to the Wabash River. The East Branch of the Mazon River, Horse Creek, the North Fork of the Vermilion River, Indian Creek, and the Mackinaw River drain northwest to the Illinois River. Many of these creeks have been modified by dredging.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly

pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small

areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

Nearly Level and Gently Sloping Soils That Have Very Slow or Slow Permeability; on Till Plains and Moraines

The major management needs on these soils are a surface drainage system, an adequate moisture supply, and erosion control.

1. Rowe-Clarence Association

Poorly drained and somewhat poorly drained, silty and clayey soils formed in a thin layer of loess or local wash and in the underlying glacial till

This association consists of Rowe soils in broad, nearly level and depressional, low areas and Clarence soils in narrow, nearly level and gently sloping, high areas and on some of the steeper side slopes. The difference in elevation between the high and low areas ranges from about 5 to 40 feet.

This association makes up about 8 percent of the county. It is about 47 percent Rowe soils, 37 percent Clarence soils, and 16 percent minor soils.

Rowe soils are poorly drained. Typically, the surface layer is black, friable silty clay loam about 14 inches thick. The subsurface layer is black, mottled, friable silty clay about 6 inches thick. The subsoil is about 32 inches thick. It is olive gray, mottled, firm silty clay. It is calcareous in the lower part. The substratum to a depth of 60 inches is olive gray, mottled, very firm, calcareous silty clay.

Clarence soils are somewhat poorly drained. Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsoil is mottled silty clay about 23 inches thick. The upper part is olive brown and firm; the next part is light olive brown, firm, and calcareous; and the lower part is olive brown, very firm, and calcareous. The substratum to a depth of 60 inches is olive brown, mottled, very firm, calcareous silty clay.

The minor soils in this association are Chatsworth, Rantoul, and Rutland soils. The moderately well drained Chatsworth soils are on the steeper side slopes. The somewhat poorly drained Rutland soils are in positions similar to those of the Clarence soils. Their subsoil is thicker and has less clay than that of the Clarence soils. The very poorly drained Rantoul soils are in depressions below the major soils.

In most areas this association is used for cultivated crops. It is moderately suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, water erosion, a high content of clay, a moderate or low available water capacity, and a high bulk density in the subsoil. Subsurface drains do not function well because of the very slow permeability. A surface drainage system generally is needed.

Mainly because of the seasonal high water table, ponding, and very slow permeability, the major soils in this association are poorly suited to use as sites for dwellings and septic tank absorption fields.

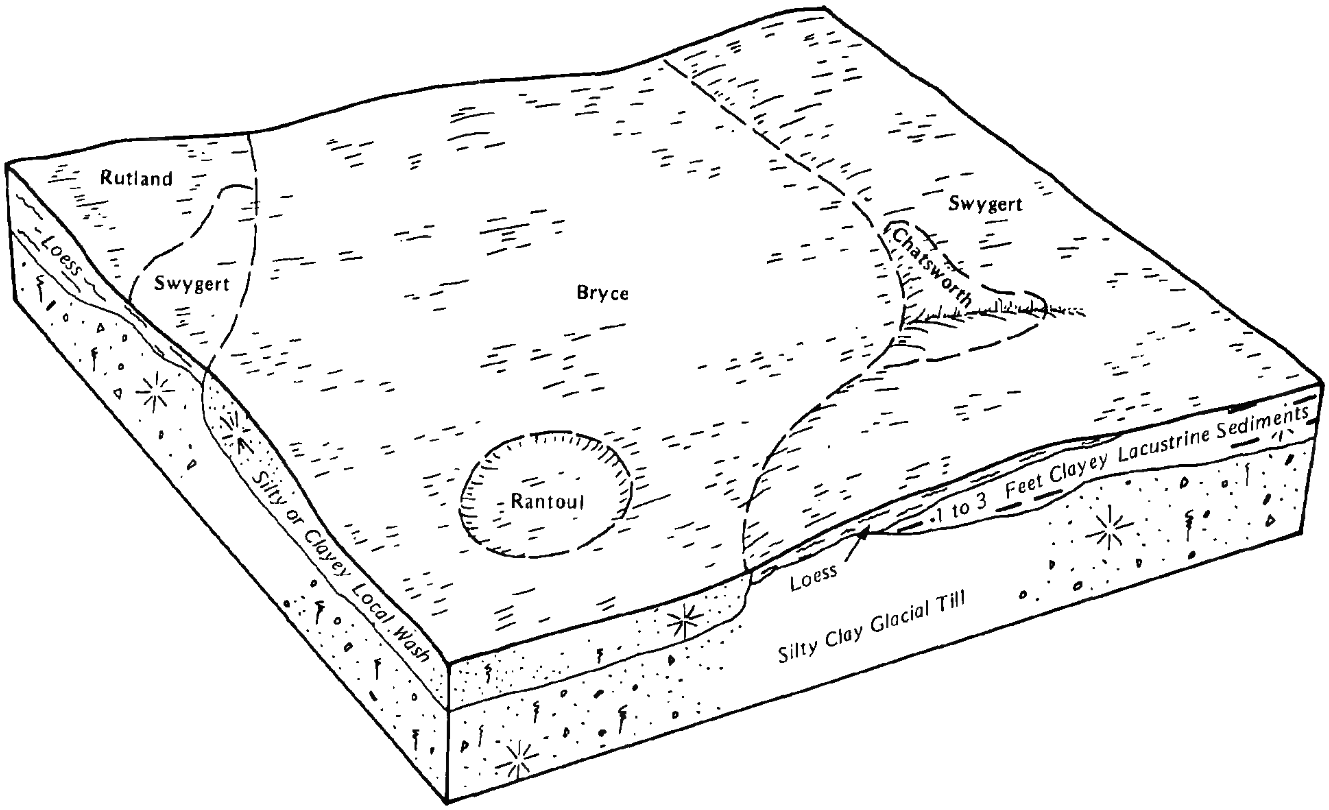


Figure 1.—Typical pattern of soils and parent material in the Bryce-Swygert association.

2. Bryce-Swygert Association

Poorly drained and somewhat poorly drained, silty soils formed in loess and lacustrine sediments or local wash and in the underlying glacial till

This association consists of Bryce soils in broad, nearly level, low areas and Swygert soils in broad, nearly level and gently sloping, high areas. The difference in elevation between the high and low areas ranges from about 5 to 40 feet.

This association makes up about 27 percent of the county. It is about 51 percent Bryce soils, 31 percent Swygert soils, and 18 percent minor soils (fig. 1).

Bryce soils are poorly drained. Typically, the surface layer is black, friable and firm silty clay loam about 12 inches thick. The subsurface layer is very dark gray, firm silty clay about 5 inches thick. The subsoil is mottled silty clay about 33 inches thick. The upper part is dark grayish brown and firm; the next part is gray and firm; and the lower part is gray and very firm. The substratum to a depth of 60 inches is gray, mottled, very firm, calcareous silty clay.

Swygert soils are somewhat poorly drained. Typically, the surface layer is black, friable silty clay loam about 13 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsoil is light olive brown, mottled, firm silty clay about 30 inches thick. It is calcareous in the lower part. The substratum to a depth of 60 inches is light olive brown, mottled, firm, calcareous silty clay.

The minor soils in this association are Chatsworth, Rantoul, and Rutland soils. The moderately well drained Chatsworth soils are on the steeper side slopes. The somewhat poorly drained Rutland soils are in positions similar to those of the Swygert soils. They have less clay in the subsoil than the Swygert soils. The very poorly drained Rantoul soils are in depressions below the major soils.

In most areas this association is used for cultivated crops. It is well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, slow or very

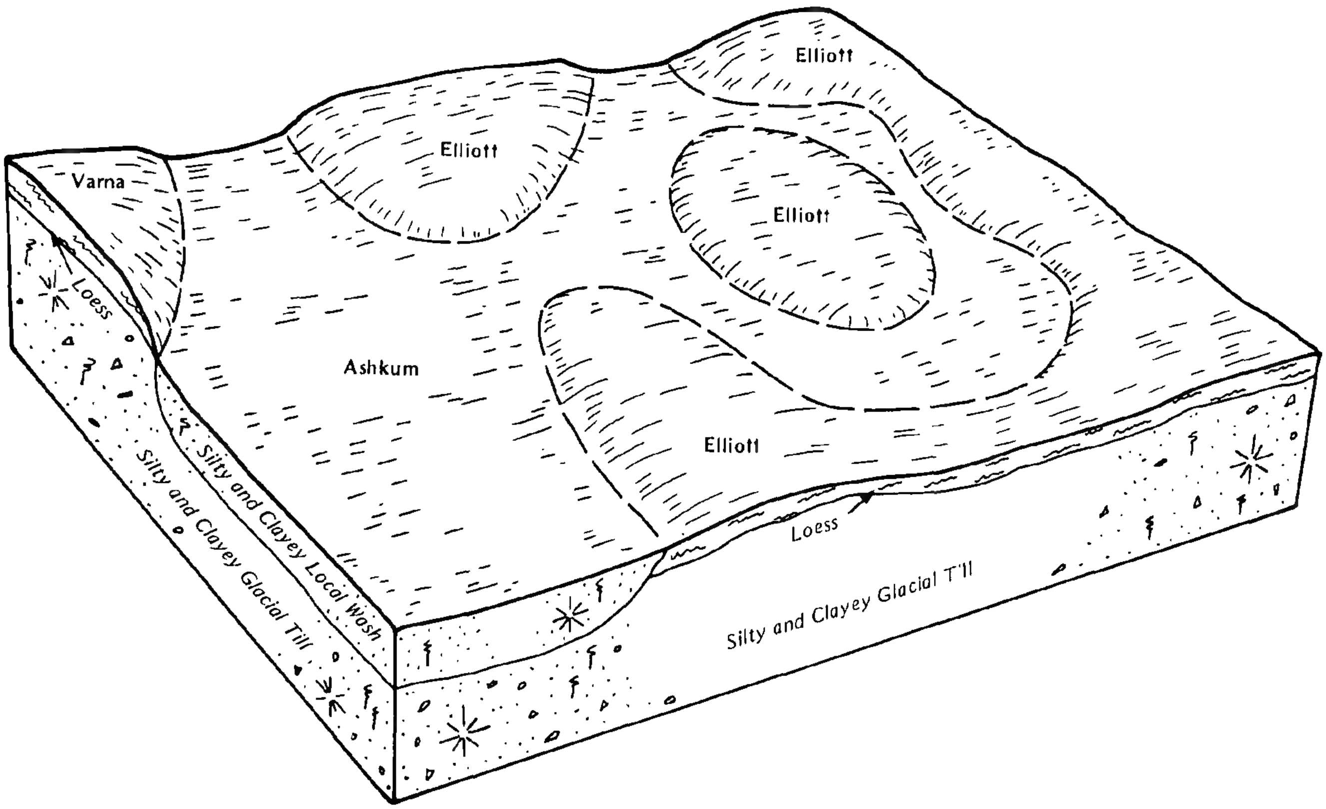


Figure 2.—Typical pattern of soils and parent material in the Elliott-Ashkum association.

slow permeability, moderate available water capacity, and water erosion. Subsurface drains do not function well because of the slow and very slow permeability. A surface drainage system generally is needed.

Mainly because of the seasonal high water table, ponding, the slow or very slow permeability, and a high shrink-swell potential, the major soils are poorly suited to use as sites for dwellings and septic tank absorption fields.

Nearly Level and Gently Sloping Soils That Have Moderately Slow or Slow Permeability; on Till Plains, Lake Plains, and Moraines

The major management needs on these soils are surface and subsurface drainage systems and erosion control.

3. Elliott-Ashkum Association

Somewhat poorly drained and poorly drained, silty soils formed in loess or local wash and in the underlying glacial till

This association consists of Elliott soils in broad, nearly level and gently sloping, high areas and on some of the steeper side slopes and Ashkum soils in broad, nearly level and depressional, low areas. The difference in elevation between the low and high areas ranges from about 5 to 40 feet.

This association makes up about 31 percent of the county. It is about 47 percent Elliott soils, 47 percent Ashkum soils, and 6 percent minor soils (fig. 2).

Elliott soils are somewhat poorly drained. Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 25 inches thick. It is mottled. The upper part is dark yellowish brown, friable silty clay; the next part is light olive brown, firm silty clay and silty clay loam; and the lower part is light olive brown, firm,

calcareous silty clay loam. The substratum to a depth of 60 inches is light olive brown, mottled, firm, calcareous silty clay loam.

Ashkum soils are poorly drained. Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 4 inches thick. The subsoil is about 30 inches thick. It is mottled. The upper part is dark grayish brown, friable silty clay loam; the next part is gray, firm silty clay; and the lower part is gray, firm, calcareous silty clay loam. The substratum to a depth of 60 inches is gray, mottled, firm, calcareous silty clay loam.

The minor soils in this association are Peotone and Varna soils. The very poorly drained Peotone soils are in depressions below the major soils. The moderately well drained Varna soils are in slightly higher positions than those of the Elliott soils.

In most areas this association is used for cultivated crops. It is well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, the erosion hazard, and moderately slow or slow permeability. A drainage system generally is needed. Subsurface drains function well in most areas.

Mainly because of the seasonal high water table, ponding, and moderately slow or slow permeability, the major soils are poorly suited to use as sites for dwellings and septic tank absorption fields.

4. Blount-Morley Association

Somewhat poorly drained and moderately well drained, silty soils formed in loess and in the underlying glacial till

This association consists of Blount soils in narrow, nearly level, low areas and Morley soils in narrow, gently sloping, high areas and on some of the steeper side slopes. The difference in elevation between the low and high areas ranges from about 5 to 30 feet.

This association makes up less than 1 percent of the county. It is about 67 percent Blount soils, 23 percent Morley soils, and 10 percent minor soils.

Blount soils are somewhat poorly drained. Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, very friable silt loam about 3 inches thick. The subsoil is about 31 inches thick. It is mottled and firm. The upper part is light yellowish brown silty clay, the next part is light olive brown silty clay, and the lower part is light olive brown silty clay loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam.

Morley soils are moderately well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 32 inches thick. The upper part is brown, friable silt loam and firm silty clay loam; the next part is olive brown, mottled, firm silty clay; and the lower part is olive brown, mottled, firm silty clay loam. The substratum to a depth of 60 inches or more is mottled light olive brown, light olive gray, and olive brown, firm, calcareous silty clay loam.

The minor soils in this association are Ashkum, Camden, Chatsworth, Del Rey, and Sawmill soils. The poorly drained Ashkum soils have a darker surface layer and are in lower positions than those of the major soils. The well drained Camden soils have more sand and less clay in the lower part than the Morley soils. They are in positions similar to those of the Morley soils. The moderately well drained Chatsworth soils are in more sloping positions than those of the major soils. The somewhat poorly drained Del Rey soils do not have clayey glacial till within a depth of 60 inches and are in positions similar to those of the Blount soils. The poorly drained Sawmill soils are subject to flooding and are in lower positions than those of the major soils.

In most areas the major soils in this association are used for cultivated crops. They are well suited to the crops commonly grown in the county. The major management concerns are the seasonal high water table, the erosion hazard, and moderately slow or slow permeability. A drainage system is generally needed in the Blount soils. Subsurface drains function well in most areas.

The major soils are poorly suited to use as sites for dwellings and septic tank absorption fields because of the moderately slow and slow permeability and the seasonal high water table.

5. Milford-Martinton-Del Rey Association

Poorly drained and somewhat poorly drained, silty soils formed in lacustrine sediments

This association consists of Milford soils in broad, nearly level, low areas and Martinton and Del Rey soils in broad to narrow, nearly level, high areas. The difference in elevation between the low and high areas ranges from about 5 to 20 feet.

This association makes up about 4 percent of the county. It is about 45 percent Milford soils, 24 percent Martinton soils, 7 percent Del Rey soils, and 24 percent minor soils (fig. 3).

Milford soils are poorly drained. Typically, the surface layer is black, friable silty clay loam about 9 inches

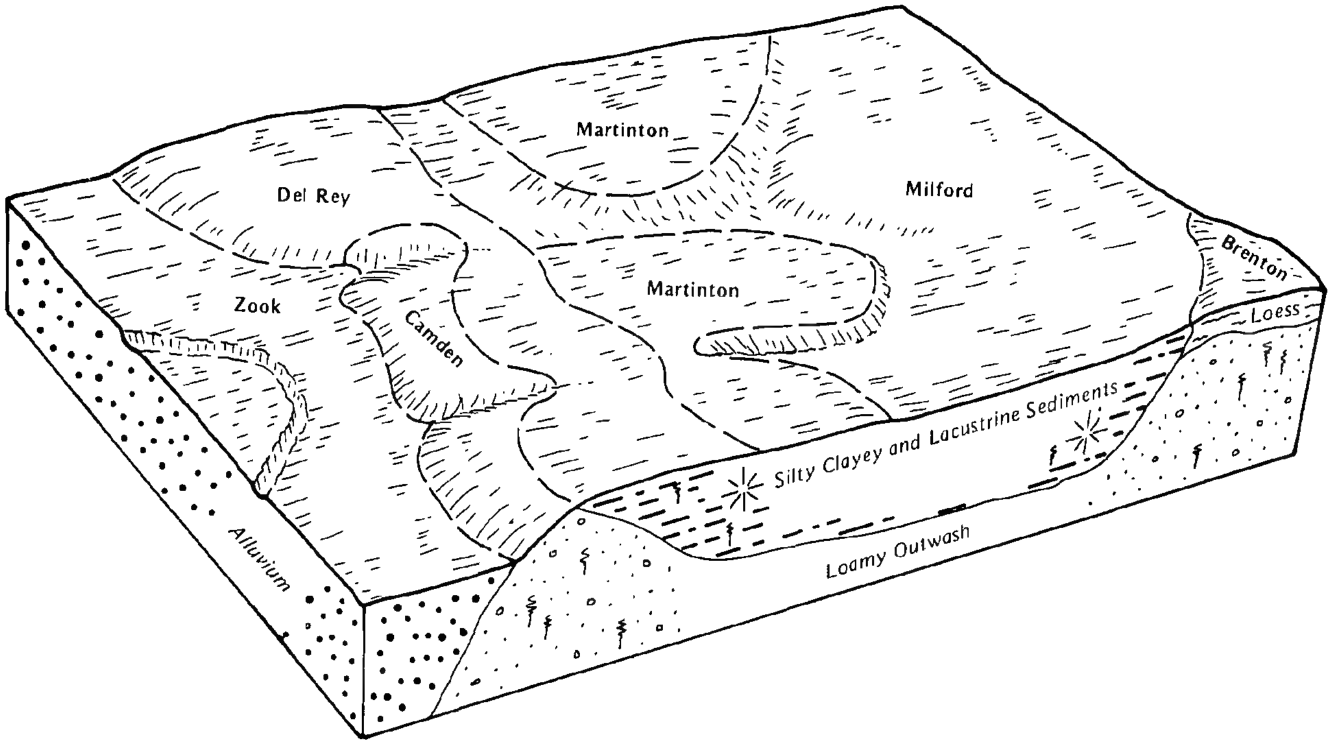


Figure 3.—Typical pattern of soils and parent material in the Milford-Martinton-Del Rey association.

thick. The subsurface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil is mottled, firm silty clay loam about 36 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is grayish brown, mottled, friable, calcareous, stratified silt loam, loam, silt, and silty clay loam.

Martinton soils are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark gray, firm silty clay loam about 5 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is brown, firm silty clay loam; the next part is grayish brown, firm silty clay; and the lower part is dark grayish brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is mottled gray and light olive brown, firm, calcareous, stratified silty clay loam and silt loam.

Del Rey soils are somewhat poorly drained. Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is light brownish gray, friable silt loam about 6 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is dark yellowish brown, friable silty clay loam. The next part is dark yellowish brown, firm silty clay and silty clay loam. The lower part is grayish brown, firm silty clay loam. The substratum to a depth of 60 inches or more is grayish brown, mottled, firm, calcareous silty clay.

The minor soils in this association are Brenton, Camden, Peotone, Sawmill, and Zook soils. The somewhat poorly drained Brenton soils have less clay in the subsoil than the Martinton soils. They are in positions similar to those of the Martinton soils. The well drained Camden soils are in slightly higher positions than those of the Del Rey soils. The very poorly drained Peotone soils are in depressions below the major soils. The poorly drained Sawmill and Zook soils are on flood plains below the major soils.

In most areas this association is used for cultivated crops. It is well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, and moderately slow and slow permeability. A drainage system generally is needed. Subsurface drains work well in most areas.

Mainly because of the seasonal high water table, ponding, and moderately slow and slow permeability, the major soils are poorly suited to use as sites for dwellings and septic tank absorption fields.

Nearly Level and Gently Sloping Soils That Have Moderate or Moderately Slow Permeability; on Till Plains and Moraines

The major management needs in areas of these soils are surface and subsurface drainage systems and erosion control.

6. Drummer-Dana-Raub Association

Poorly drained to moderately well drained, silty soils formed in loess and in the underlying glacial till or glacial outwash

This association consists of Drummer soils in narrow, nearly level, low areas, Dana soils in broad to narrow, nearly level to gently sloping, high areas, and Raub soils in broad to narrow, nearly level, high areas. The difference in elevation between the low and high areas ranges from about 5 to 70 feet.

This association makes up 6 percent of the county. It is about 49 percent Drummer soils, 22 percent Dana soils, 18 percent Raub soils, and 11 percent minor soils (fig. 4).

Drummer soils are poorly drained. Typically, the surface soil is black, friable silty clay loam about 16 inches thick. The subsoil is mottled, friable silty clay loam about 39 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is mottled grayish brown, gray, and yellowish brown, friable, stratified loam and silty clay loam.

Dana soils are moderately well drained. Typically, the surface layer is very dark brown, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 47 inches thick. It is mottled. The upper part is brown, friable silt loam; the next part is dark yellowish brown, firm silty clay loam; and the lower part is olive brown, firm clay loam and silt loam. The substratum to a depth of 60 inches or more is olive brown, mottled, firm, calcareous silt loam.

Raub soils are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 6 inches thick. The subsoil is about 29 inches thick. It is mottled. The upper part is yellowish brown, friable silty clay loam. The lower part is light olive brown, friable and firm, calcareous silt loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous loam.

The minor soils in this association are Corwin and Peotone soils. The moderately well drained Corwin soils are in more sloping positions than those of the major soils. The very poorly drained Peotone soils are in depressions below the major soils.

In most areas the major soils in this association are used for cultivated crops. They are well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, and the erosion hazard. In most areas of the Drummer and Raub soils, a drainage system helps to lower the water table. Measures that maintain the drainage system are needed. Subsurface drains function well.

The major soils generally are poorly suited to use as sites for dwellings and septic tank absorption fields. The seasonal high water table, ponding, and moderately slow permeability are limitations. The limitations of the Dana soils are less severe than those of the Drummer and Raub soils.

Nearly Level Soils That Have Moderate or Moderately Slow Permeability; on Lake Plains and Outwash Plains

The major management needs on these soils are surface and subsurface drainage systems.

7. Pella-Milford Association

Poorly drained, silty soils formed in lacustrine sediments and in the underlying glacial outwash

This association consists of Pella soils in very broad, nearly level, low areas and Milford soils in shallow depressions. The difference in elevation between the two soils is less than 5 feet.

This association makes up about 9 percent of the county. It is about 80 percent Pella soils, 12 percent Milford soils, and 8 percent minor soils.

Typically, the surface soil of the Pella soils is black, friable silty clay loam about 12 inches thick. The subsoil is about 30 inches thick. It is mottled and friable. The upper part is grayish brown silty clay loam. The next part is grayish brown, mottled, calcareous silty clay loam. The lower part is gray, mottled, calcareous silty clay loam and silt loam. The substratum to a depth of 60 inches or more is gray, mottled, friable, calcareous, stratified silt loam, loam, and sandy loam.

Typically, the surface layer of the Milford soils is black, friable silty clay loam about 9 inches thick. The

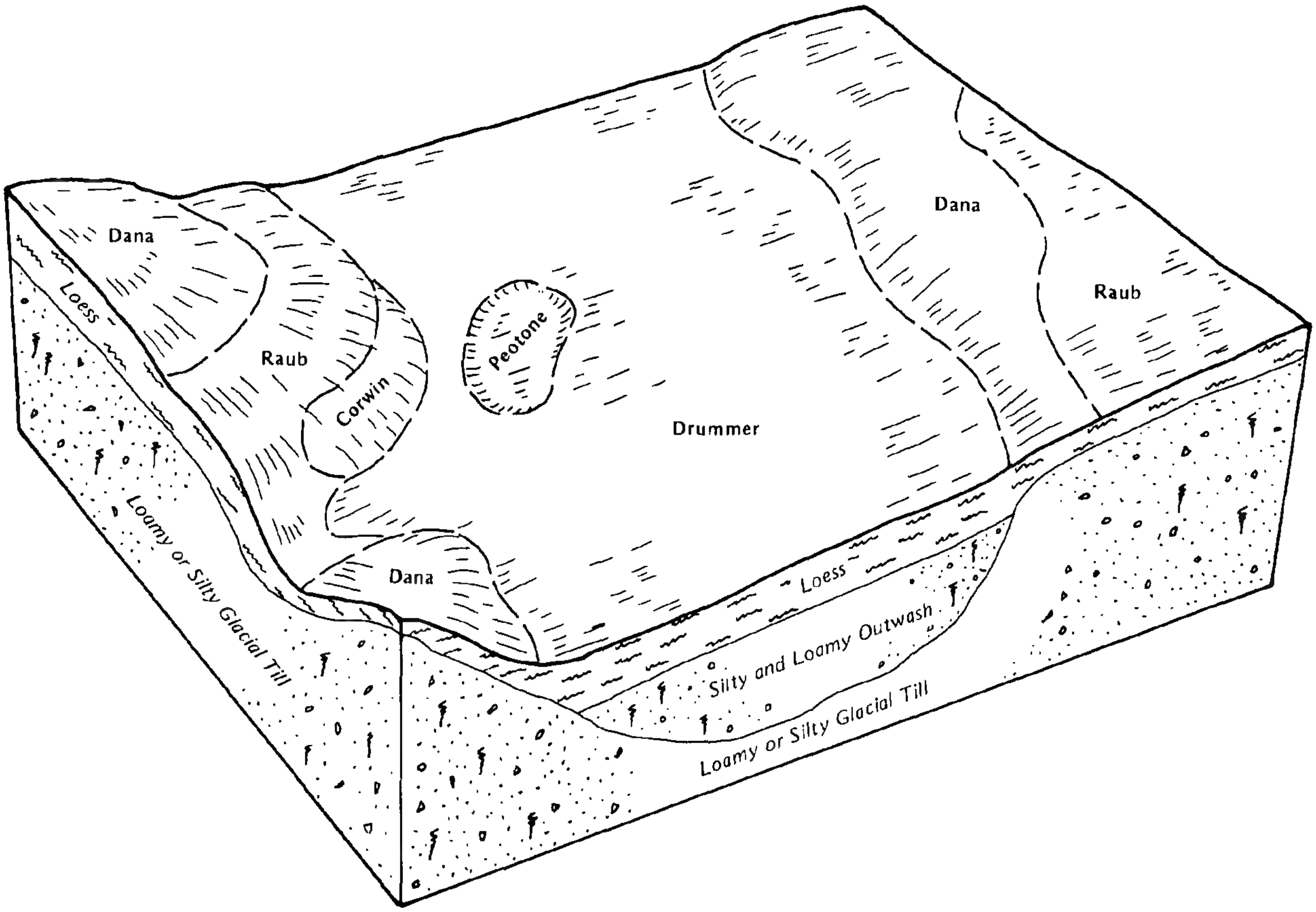


Figure 4.—Typical pattern of soils and parent material in the Drummer-Dana-Raub association.

subsurface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil is mottled, firm silty clay loam about 36 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is grayish brown, mottled, friable, calcareous, stratified silt loam, loam, and silty clay loam.

The minor soils in this association are La Hogue and Selma soils. The somewhat poorly drained La Hogue soils are in higher positions than those of the Pella soils. The poorly drained Selma soils are in positions similar to those of the Pella soils. They are sandier in the subsoil than the Pella soils.

In most areas the major soils of this association are used for cultivated crops. They are well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table and ponding in areas of both the major soils and the moderately slow permeability in the Milford soils. A drainage system generally is needed. Subsurface drains work well.

The major soils are poorly suited to use as sites for dwellings and septic tank absorption fields. The seasonal high water table and ponding in areas of both the major soils and the moderately slow permeability in the Milford soils are the major limitations.

8. Drummer-Brenton Association

Poorly drained and somewhat poorly drained, silty soils formed in loess and in the underlying glacial outwash

This association consists of Drummer soils in very broad, nearly level, low areas and Brenton soils in broad, nearly level, slightly higher areas. The difference in elevation between the low and high areas ranges from about 3 to 30 feet.

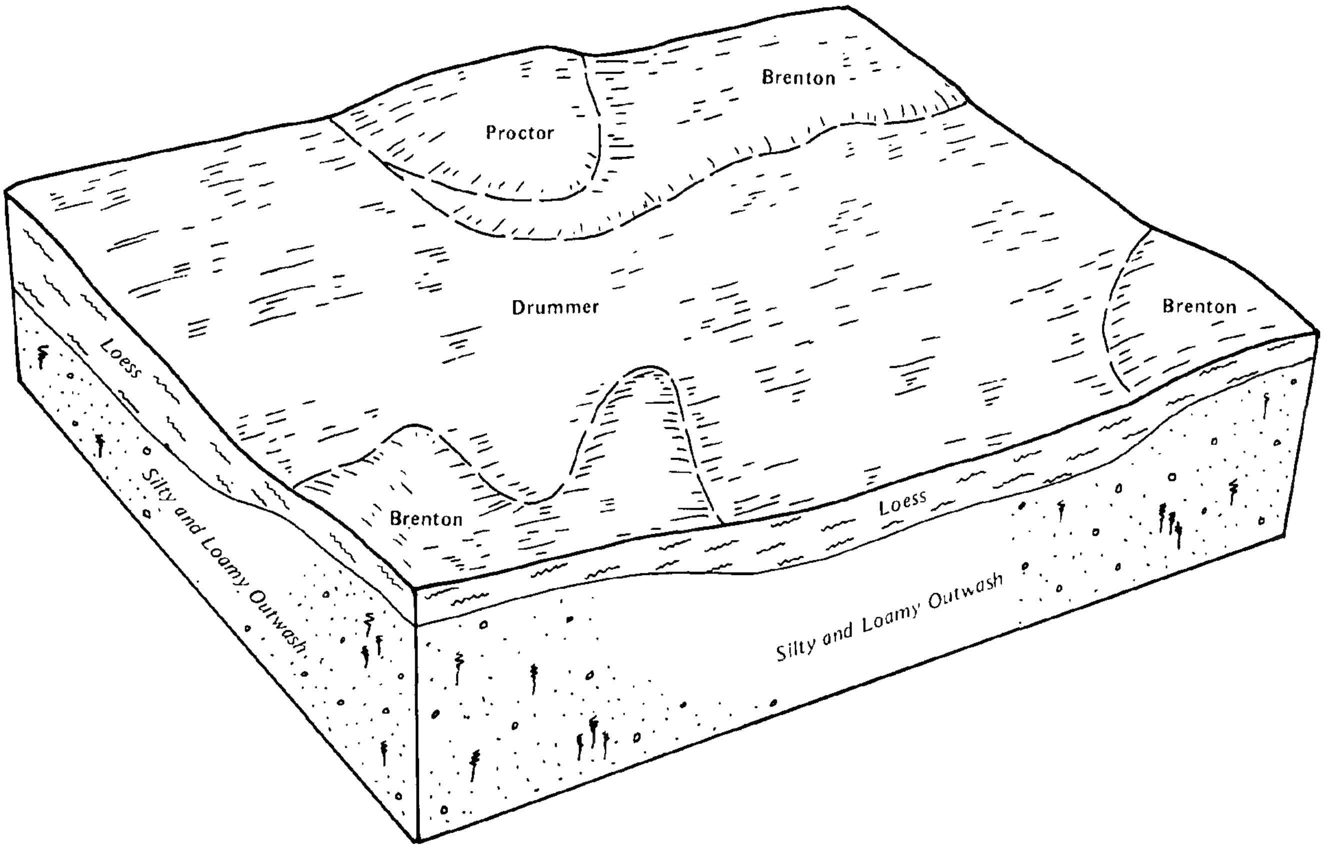


Figure 5.—Typical pattern of soils and parent material in the Drummer-Brenton association.

This association makes up about 13 percent of the county. It is about 54 percent Drummer soils, 22 percent Brenton soils, and 24 percent minor soils (fig. 5).

Drummer soils are poorly drained. Typically, the surface soil is black, friable silty clay loam about 16 inches thick. The subsoil is mottled, friable silty clay loam about 39 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is mottled gray, grayish brown, and yellowish brown, friable, stratified loam and silty clay loam.

Brenton soils are somewhat poorly drained. Typically, the surface soil is very dark gray, friable silt loam about 14 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is brown, firm silty clay loam; the next part is yellowish brown, friable silt loam; and the lower part is yellowish brown, friable, stratified clay loam and gravelly clay loam. The substratum to a depth of 60 inches or more is mottled yellowish brown and light brownish gray, friable, calcareous, stratified sandy loam and gravelly sandy loam.

The minor soils in this association are Harpster, Milford, and Proctor soils. The poorly drained Harpster and Milford soils are in positions similar to those of the Drummer soils. Harpster soils have a calcareous surface layer. Milford soils have more clay in the subsoil than the Drummer soils. The well drained Proctor soils are in positions higher than those of the Brenton soils and commonly are on long, narrow ridges.

In most areas the major soils in this association are used for cultivated crops. They are well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table and ponding. A drainage system generally is needed. Subsurface drains work well.

The major soils are poorly suited to use as sites for dwellings and septic tank absorption fields. The seasonal high water table and ponding are the major limitations.

Nearly Level and Gently Sloping Soils That Have Moderate Permeability in the Subsoil and Moderately Rapid or Rapid Permeability in the Substratum; on Outwash Ridges

The major management needs on these soils are surface and subsurface drainage systems and erosion control.

9. Selma-Ridgeville-Onarga Association

Poorly drained, somewhat poorly drained, and well drained, loamy soils formed in glacial outwash

This association consists of Selma soils in broad, nearly level, low areas and Ridgeville and Onarga soils in narrow and very narrow, nearly level and gently sloping, higher areas. The difference in elevation between the low and high areas ranges from about 3 to 20 feet.

This association makes up less than 1 percent of the county. It is about 71 percent Selma soils, 15 percent Ridgeville soils, 9 percent Onarga soils, and 5 percent minor soils.

Selma soils are poorly drained. Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is black and very dark gray, friable loam about 13 inches thick. The subsoil is about 25 inches thick. It is mottled and firm. The upper part is grayish brown clay loam, and the lower part is gray, grayish brown, and light olive brown loam. The substratum to a depth of 60 inches or more is mottled gray, grayish brown, and light olive brown, friable, stratified sandy loam and loam.

Ridgeville soils are somewhat poorly drained. Typically, the surface layer is very dark gray, very friable fine sandy loam about 12 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is dark brown, friable loam, and the lower part is yellowish brown, very friable, stratified loamy sand and sandy loam. The substratum to a depth of 60 inches or more is mottled light brownish gray and yellowish brown, very friable, stratified sandy loam, loamy sand, and sand.

Onarga soils are well drained. Typically, the surface layer is very dark brown, friable fine sandy loam about 10 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable fine sandy loam. The next part is yellowish brown, very friable fine sandy loam. The lower part is yellowish brown, very friable loamy fine sand. The substratum to a depth of 60 inches or more is yellowish brown, mottled, loose loamy fine sand.

The minor soils in this association are Milford and Pella soils. The poorly drained Milford soils are in slightly lower positions than those of the Selma soils. Also, they have more clay in the subsoil. The poorly drained Pella soils have less sand in the subsoil than the Selma soils. They are in positions similar to those of the Selma soils.

In most areas the major soils in this association are used for cultivated crops or pasture. They are well suited to the cultivated crops commonly grown in the county. The major management concerns are the seasonal high water table, ponding, moderate available water capacity, and the hazards of erosion and soil blowing. A drainage system generally is needed in areas of the Selma and Ridgeville soils. Subsurface drains work well.

The major soils are poorly suited to use as sites for dwellings and septic tank absorption fields. The main limitations are the seasonal high water table, ponding, and moderately rapid or rapid permeability in the substratum.

Nearly Level Soils That Have Moderate or Slow Permeability; on Flood Plains

These soils are subject to frequent flooding. The major management needs are surface and subsurface drainage systems and protection from flooding.

10. Sawmill-Zook Association

Poorly drained, silty soils formed in alluvium

This association consists of broad to narrow, nearly level, low areas. The difference in elevation between the two soils is less than 3 feet.

This association makes up about 1 percent of the county. It is about 69 percent Sawmill soils, 26 percent Zook soils, and 5 percent minor soils.

Typically, the surface layer of the Sawmill soils is black, friable silty clay loam about 8 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The subsoil is silty clay loam about 34 inches thick. The upper part is very dark gray and friable. The lower part is dark grayish brown, mottled, and friable and firm. The substratum to a depth of 60 inches or more is dark grayish brown, mottled, firm silty clay loam.

Typically, the surface soil of the Zook soils is black, friable silty clay loam about 25 inches thick. The subsoil is mottled, firm silty clay about 25 inches thick. The upper part is black, and the lower part is dark gray. The substratum to a depth of 60 inches or more is dark gray, firm, calcareous silty clay.

The minor soils in this association are the somewhat

poorly drained Blount and well drained Camden soils. These soils are in positions higher than those of the major soils and are not subject to flooding.

In most areas the major soils of this association are used for cultivated crops. If protected from flooding, the soils generally are well suited to the cultivated crops commonly grown in the county. The major management concerns are flooding and the seasonal high water table. Slow permeability is an additional concern in the Zook soils. A drainage system generally is needed.

The major soils are unsuited to use as sites for dwellings and septic tank absorption fields. The main limitations are flooding and the seasonal high water table in areas of both the major soils and the slow permeability in the Zook soils.

Broad Land Use Considerations

The soils in Ford County vary widely in their suitability for major land uses. Most of the acreage is used for cultivated crops, primarily corn and soybeans. The major soils in the associations generally are well suited to cultivated crops. The main management concerns are the erosion hazard, the seasonal high water table, and ponding. Sawmill and Zook soils are frequently flooded mainly in winter and early in spring. The floodwater causes slight or moderate crop damage. A low or moderate available water capacity is a limitation in the Rowe-Clarence association.

A small acreage in the county is used for pasture. All associations are suitable for grasses and legumes. A low or moderate available water capacity is the main limitation in the Rowe-Clarence association.

Only small areas in the county are used as woodland. They are mostly adjacent to creeks and streams. The soils in these areas generally are suited to woodland.

Some small areas in the county have been developed or built up for urban uses. Most of the major soils in the associations are poorly suited to building site development. The seasonal high water table, ponding, low strength, the shrink-swell potential, and frost action are the main management concerns. In addition, the Onarga soils in association 9 are poorly suited to onsite waste disposal because of a poor filtering capacity. The rapid movement of effluent through these soils may result in the pollution of ground water. Generally, each association has small areas of minor soils that are well suited or moderately suited to building site development.

The suitability of the associations for recreational development ranges from well suited to unsuited. The suitability depends partly on the intensity of the expected use. The Dana soils in association 6 and the Onarga soils in association 9 are well suited to intensive recreational uses. All the other major soils in the associations generally are unsuited to recreational development. The seasonal high water table is the main limitation. Flooding is an additional limitation in areas of the Sawmill-Zook association. At least some small areas of minor soils that are suited to recreational development generally are nearby.

The major soils in the associations generally are moderately suited to habitat for wildlife. Swygert, Elliott, Dana, Brenton, and Ridgeville soils are well suited to habitat for openland and woodland wildlife. Martinton, Del Rey, and Clarence soils are well suited to habitat for woodland wildlife. Rowe, Bryce, Ashkum, Milford, Sawmill, and Zook soils are well suited to habitat for wetland wildlife. Drummer and Pella soils are well suited to habitat for openland and wetland wildlife.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Elliott silt loam, 2 to 5 percent slopes, eroded, is a phase of the Elliott series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

23A—Blount silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on rises on till plains and moraines near the major streams. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, very friable silt loam about 3 inches thick. The subsoil is about 31 inches thick. It is mottled and firm. The upper part is light yellowish brown silty clay, the next part is light olive brown silty clay, and the lower part is light olive brown silty clay loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam. In some areas the surface layer is darker. In other areas the subsoil has less clay and more sand. In places depth to the seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils in the slightly lower positions. These soils make up 2 to 10 percent of the unit.

Water and air move through the Blount soil at a slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is moderate. Organic matter content also is moderate. The surface layer is friable but tends to crust after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Surface and subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where slopes are long and more than 2 percent. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

Plants grazed by livestock or harvested for hay grow well on this soil. Deferred grazing when the soil is wet helps to prevent surface compaction, excessive runoff, and poor tilth. Either a combination of subsurface tile and surface inlets or a shallow surface drainage system helps to drain low spots. Unmowed strips, 30 to 50 feet wide, at the edge of hayland provide excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around foundations helps to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing subsurface drains helps to lower the water table. Enlarging the absorption field or replacing the soil with more permeable material helps to overcome the slow permeability.

The land capability classification is IIw.

56B—Dana silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges on till plains and moraines. Individual areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 47 inches thick. It is mottled. The upper part is brown, friable silt loam; the next part is dark yellowish brown, firm silty clay loam; and the lower part is olive brown, firm clay loam and silt loam. The substratum to a depth of 60 inches or more is olive brown, mottled, firm, calcareous silt loam. In some areas erosion has thinned the surface layer. In other areas depth to the seasonal high water table is less than 3 feet.

Water and air move through the upper part of this soil at a moderate rate and through the lower part at a moderately slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately suited to use as a site for dwellings and is poorly suited to use as a site for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IIe.

67—Harpster silty clay loam. This nearly level, poorly drained soil is in low areas on outwash plains and lake plains. It is ponded for brief periods. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is black, friable, calcareous silty clay loam about 9 inches thick. The subsurface layer is very dark gray, friable, calcareous silty clay loam about 9 inches thick. The subsoil is silty clay loam about 23 inches thick. It is calcareous, firm, and mottled. The upper part is dark grayish brown; the next part is dark gray; and the lower part is mottled, olive brown, olive yellow, and gray. The substratum to a depth of 60 inches or more is gray and light olive

brown, friable, calcareous loam and silt loam. In some areas the surface layer does not have carbonates. In other areas the subsoil has more clay.

Included with this soil in mapping are small areas of the very poorly drained Peotone soils. These soils have more clay in the subsoil than the Harpster soils. They are ponded for long periods and are in depressions below the Harpster soil. They make up 1 to 8 percent of the unit.

Water and air move through the Harpster soil at a moderate rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below. Available water capacity is very high. Organic matter content is high. The surface layer is friable, but it becomes compact and cloddy if it has been plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Applications of lime are not needed. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table with surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard. Installing surface and subsurface drains lowers the water table. Also, adding several feet of permeable fill material increases the depth to the seasonal high water table.

The land capability classification is IIw.

69—Milford silty clay loam. This nearly level, poorly drained soil is in depressions and low areas on lake plains. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to more than 1,000 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 7 inches thick. The subsoil is mottled, firm silty clay loam about 36 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is grayish brown, mottled, friable, calcareous, stratified silt loam, loam, silt, and silty clay loam. In some areas depth to the seasonal high water table is more than 2 feet. In other areas the subsoil has either more clay or less clay.

Included with this soil in mapping are small areas of the very poorly drained Peotone soils, which are ponded for long periods. These soils are in depressions below the Milford soil. They make up 2 to 10 percent of the unit.

Water and air move through the Milford soil at a moderately slow rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is high. Organic matter content also is high. The surface layer is friable but becomes compact and cloddy if it has been plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains function satisfactorily if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table with surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard and the moderately slow permeability is a limitation. Installing surface and subsurface drains lowers the seasonal high water table. Adding several feet of more permeable fill material increases the depth to the seasonal high water table. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IIw.

91A—Swygert silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on rises on till plains and moraines. Individual areas are irregular in shape and are 3 to 80 acres in size.

Typically, the surface layer is black, friable silty clay loam about 13 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsoil is light olive brown, mottled, firm silty clay about 30 inches thick. It is calcareous in the lower part. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay. In some areas the surface layer is thinner and lighter in color because of erosion. In other areas the slope is more than 2 percent. In places the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in slightly lower positions than those of the Swygert soil. They make up 2 to 10 percent of the unit.

Water and air move through the subsoil of the Swygert soil at a slow rate and through the substratum at a very slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is moderate. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas used for corn, soybeans, or small grain, the seasonal high water table is a limitation. Installing a drainage system helps to lower the water table and to improve soil productivity. Surface and subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where slopes are long. A conservation tillage system that leaves crop residue on the surface after planting and contour farming help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around the foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and very slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIw.

91B2—Swygert silty clay loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes on till plains and moraines. Individual areas are irregular in shape and range from 3 to 150 acres in size.

Typically, the surface layer is mixed very dark gray and very dark grayish brown, friable silty clay loam. It has been eroded to a thickness of about 6 inches. The subsoil is mottled, firm silty clay about 31 inches thick. The upper part is yellowish brown, and the lower part is light olive brown and calcareous. The substratum to a depth of 60 inches or more is light gray, light olive brown, and yellowish brown, firm, calcareous silty clay. In some areas the surface layer is thicker and darker. In other areas the subsoil is thicker.

Included with this soil in mapping are small areas of the poorly drained Bryce soils. These soils are in slightly lower positions than those of the Swygert soil. They make up 2 to 9 percent of the unit.

Water and air move through the upper part of the Swygert soil at a slow rate and through the lower part at a very slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is low. Organic matter content is moderate. The surface layer is compact and cloddy if it has been plowed when too wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material improves soil tilth and soil fertility.

In areas used for pasture, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion. Leaving unmowed strips, 30 to 50 feet wide, at the edge of hayland provides excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings, the high water table and shrink-swell potential are limitations. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and very slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIe.

102—La Hogue loam. This nearly level, somewhat poorly drained soil is on rises on outwash plains and lake plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable loam about 13 inches thick. The subsurface layer is very dark brown, friable loam about 3 inches thick. The subsoil is about 32 inches thick. It is friable and mottled. The upper part is brown clay loam, the next part is olive brown clay loam and sandy loam, and the lower part is light olive brown sandy loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, friable sandy loam. In some areas the surface layer is thinner and lighter in color as a result of erosion.

Included with this soil in mapping are small areas of the poorly drained Drummer, Pella, and Selma soils and the well drained Jasper soils. Drummer, Pella, and Selma soils are in slightly lower positions than those of the La Hogue soil. Jasper soils are in higher positions than those of the La Hogue soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the La Hogue soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. In some years the seasonal high water table delays planting. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Installing underground drains lowers the water table.

The land capability classification is I.

103—Houghton muck. This nearly level, very poorly drained soil is in depressions. It is ponded for long periods in spring. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is black, highly decomposed muck about 12 inches thick. The underlying material to a depth of 60 inches is very dark gray and very dark grayish brown muck. In some areas the decomposed organic material is not so thick. In other areas the surface layer is silt loam.

Included with this soil in mapping are small areas of soils that are ponded during most of the year. Also included are areas of drained soils used for cultivated crops. Included areas make up 2 to 15 percent of the unit.

Water and air move through the Houghton soil at a moderately slow to moderately rapid rate. Surface runoff is very slow or ponded. The seasonal high water table ranges from 1 foot above the surface to 1 foot below. Available water capacity is very high. Organic matter content also is very high. The potential for frost action is high. The soil is very unstable. It is highly compressible when subjected to heavy loads and is subject to subsidence when drained.

Most areas are undrained and uncultivated. A few small areas are drained. This soil is well suited to habitat for wetland wildlife. It generally is unsuited to cultivated crops, hay, and pasture because of the ponding. It is poorly suited to habitat for openland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of ponding and subsidence.

Areas of this soil provide good habitat for wetland wildlife. The soil naturally supports wetland plants, and shallow water areas are available.

The land capability classification is Vw.

107—Sawmill silty clay loam. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods. Individual areas are irregular in shape and range from 50 to more than 2,000 acres in size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer is black, firm silty clay loam about 6 inches thick. The

subsoil is silty clay loam about 34 inches thick. The upper part is very dark gray and friable. The lower part is dark grayish brown, mottled, and friable and firm. The substratum to a depth of 60 inches or more is dark grayish brown, mottled, firm silty clay loam. In some areas the subsoil is darker throughout. In other areas the soil has more clay throughout. In places the subsoil has more sand.

Water and air move through this soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 2 feet. Available water capacity is high. Organic matter content also is high. The surface layer is friable, but it is compact and cloddy if plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately well suited to habitat for wetland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of the flooding.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains help to lower the seasonal high water table. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used for pasture and hay, the flooding is a hazard and the seasonal high water table is a limitation. Constructing dikes and diversions helps to control flooding, and installing subsurface drains lowers the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

125—Selma loam. This nearly level, poorly drained soil is in low areas on outwash ridges and lake plains. It is occasionally ponded for brief periods. Individual areas are irregular in shape and range from 3 to 700 acres in size.

Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is black and very dark gray, friable loam about 13 inches thick. The subsoil is about 25 inches thick. It is mottled and firm. The upper part is grayish brown clay loam, and the lower part is gray, grayish brown, and light olive brown loam. The substratum to a depth of 60 inches or more is mottled gray, grayish brown, and light olive brown, friable, stratified sandy loam and loam. In some areas the surface layer and subsoil have less sand. In other areas depth to the seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of the well drained Jasper soils. These soils are subject to water erosion and are in higher positions than those of the Selma soil. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Selma soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas surface runoff is very slow or ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table by installing surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard. Installing surface and subsurface drains lowers the seasonal high water table. Also, adding several feet of permeable fill material increases the depth to the seasonal high water table.

The land capability classification is IIw.

134A—Camden silt loam, 0 to 3 percent slopes. This nearly level, well drained soil is on ridges on outwash plains. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsoil is about 48 inches thick. The upper part is dark brown, friable silt loam; the next part is dark yellowish brown, firm silty clay loam; and the lower part is dark yellowish brown, friable silt loam and clay loam. The substratum to a depth of 60 inches or more is mottled yellowish brown

and brown, friable, stratified sandy loam and gravelly sandy loam. In some areas the surface layer is darker. In other areas the subsoil has more clay.

Included with this soil in mapping are small areas of the poorly drained Drummer and Milford soils. These soils are in lower positions than those of the Camden soil. They make up 1 to 5 percent of the unit.

Water and air move through the Camden soil at a moderate rate. In cultivated areas surface runoff is slow. Available water capacity is high. Organic matter content is moderately low. The surface layer is friable, but it tends to crust after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture, to habitat for openland wildlife, to use as a site for dwellings with basements, and to use as a site for septic tank absorption fields. It is moderately well suited to use as a site for dwellings without basements.

No major limitations affect the use of this soil for corn, soybeans, or small grain. Erosion is a hazard in areas where slopes are very long. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

Pasture plants and hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is I.

146A—Elliott silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on rises on till plains and moraines. Individual areas are irregular in shape and range from 3 to 240 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is about 25 inches thick. It is mottled. The upper part is dark yellowish brown, friable silty clay; the next part is light olive brown, firm silty clay and silty clay loam; and the lower part is light olive brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous silty clay loam. In some areas the surface is thinner and lighter in color because of erosion. In other areas depth to the seasonal high water table is more than 3 feet. In places the slope is more than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils. These soils are in slightly lower positions than those of the Elliott soil. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Elliott soil at a moderately slow rate and through the lower part at a slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, the seasonal high water table is a limitation. Installing a drainage system helps to lower the water table and to improve productivity. Surface drains and subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where the slopes are very long. A conservation tillage system that leaves crop residue on the surface after planting and contour farming help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around the foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material helps to overcome the slow permeability.

The land capability classification is IIw.

146B2—Elliott silt loam, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes on till plains and moraines.

Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is very dark gray and very dark grayish brown, friable silt loam about 6 inches thick. It has been mixed with the upper part of the subsoil during cultivation. The subsoil is light olive brown, mottled, firm silty clay loam about 20 inches thick. It is calcareous in the lower part. The substratum to a depth of 60 inches or more is mottled light olive brown, light gray, and light olive gray, firm, calcareous silty clay loam. In some areas the surface layer is thicker and darker. In other areas depth to the seasonal high water table is more than 3 feet. In places the slope is less than 2 or more than 5 percent.

Included with this soil in mapping are small areas of the poorly drained Ashkum soils and the moderately well drained Chatsworth soils. Ashkum soils are in slightly lower positions than those of the Elliott soil. Chatsworth soils have a very low available water capacity and are in more sloping positions than those of the Elliott soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Elliott soil at a moderately slow rate and through the lower part at a slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity and organic matter content are moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, further erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material improves soil tilth and soil fertility.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around foundations helps to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material improves the absorption of liquid waste.

The land capability classification is IIe.

147A—Clarence silty clay loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on rises on till plains and moraines. Individual areas are irregular in shape and range from 3 to 90 acres in size.

Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsoil is mottled silty clay about 23 inches thick. The upper part is olive brown and firm; the next part is light olive brown, firm, and calcareous; and the lower part is olive brown, very firm, and calcareous. The substratum to a depth of 60 inches or more is olive brown, mottled, very firm, calcareous silty clay. In some areas the surface layer is thinner and lighter in color because of erosion. In other areas the subsoil has less clay. In places the slope is more than 2 percent.

Included with this soil in mapping are small areas of the poorly drained Rowe soils and the somewhat poorly drained Rutland soils. Rowe soils are in slightly lower positions than those of the Clarence soil. Rutland soils have a high available water capacity and contain less clay in the subsoil than the Clarence soil. They are in positions similar to those of the Clarence soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Clarence soil at a very slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is low. Organic matter content is moderate. The surface layer is friable, but it becomes compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, the seasonal high water table and low available water capacity are limitations and erosion is a hazard. Installing surface drains helps to lower the seasonal high water table and to improve soil productivity. Surface drains work well if suitable outlets are available. Returning crop residue to the soil conserves moisture and improves soil tilth. A conservation tillage system that leaves crop residue on the surface after planting and contour farming help to control erosion.

Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and very slow permeability are limitations. Installing underground drains lowers the water table. Replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIIw.

147B2—Clarence silty clay, 2 to 5 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on side slopes on till plains and moraines. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is mixed very dark grayish brown and light olive brown, friable silty clay about 9 inches thick. The subsoil is mottled, firm silty clay about 17 inches thick. The upper part is light olive brown, and the lower part is mottled light olive brown, light gray, and yellowish brown and is calcareous. The substratum to a depth of 60 inches is mottled light olive brown, light gray, and yellowish brown, very firm, calcareous silty clay. In places the surface layer is thicker and darker. In some areas the subsoil contains less clay. In other areas the slope is less than 2 or more than 5 percent.

Included with this soil in mapping are small areas of the poorly drained Rowe soils and the somewhat poorly drained Rutland soils. Rowe soils are in slightly lower positions than those of the Clarence soil. Rutland soils have a high available water capacity and are in positions similar to those of the Clarence soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Clarence soil at a very slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is low. Organic matter content is moderate. The surface layer is friable, but it becomes compact and cloddy if it has been plowed when too wet. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops, to hay and pasture, and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, further erosion is a hazard. Also, the low available water capacity is a limitation. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material conserves moisture and improves soil tilth and soil fertility.

In areas of this soil used for pasture, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion. Leaving unmowed strips, 30 to 50 feet wide, at the edge of hayland provides excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and very slow permeability are limitations. Installing underground drains lowers the water table. Replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIIe.

148B—Proctor silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on ridges on outwash plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 26 inches thick. It is dark yellowish brown and friable. The upper part is silty clay loam, and the lower part is loam. The substratum to a depth of 60 inches or more is dark yellowish brown, friable sandy loam. In some areas the surface soil is thinner and lighter in color because of erosion. In other areas the subsoil has more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Brenton soils. These soils are in slightly lower positions than those of the Proctor

soil. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Proctor soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture, to habitat for openland wildlife, and to use as a site for septic tank absorption fields. It is moderately well suited to use as a site for dwellings.

In areas of this soil used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

149—Brenton silt loam. This nearly level, somewhat poorly drained soil is on rises on outwash plains. Individual areas are irregular in shape and range from 3 to 180 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 14 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is brown, firm silty clay loam; the next part is yellowish brown, friable silt loam; and the lower part is yellowish brown, friable, stratified clay loam and gravelly clay loam. The substratum to a depth of 60 inches or more is mottled yellowish brown and light brownish gray, friable, calcareous, stratified sandy loam and gravelly sandy loam. In some areas the upper part of the subsoil has more sand.

Included with this soil in mapping are small areas of the poorly drained Drummer soils and the well drained Proctor soils. Drummer soils are in slightly lower positions than those of the Brenton soil. Proctor soils are in higher positions than those of the Brenton soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Brenton soil at a moderate rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. In some years the seasonal high water table delays planting. Subsurface tile drains work well if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Installing underground drains lowers the water table.

The land capability classification is I.

150B—Onarga fine sandy loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on outwash ridges. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is very dark brown, friable fine sandy loam about 10 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable fine sandy loam. The next part is yellowish brown, very friable fine sandy loam. The lower part is yellowish brown, very friable loamy fine sand. The substratum to a depth of 60 inches or more is yellowish brown, mottled, loose loamy fine sand. In some areas the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Drummer, Pella, and Selma and somewhat poorly drained La Hogue and Ridgeville soils. These soils are in lower positions than those of the Onarga soil. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Onarga soil at a moderate rate and through the lower part at a rapid rate. In cultivated areas surface runoff is medium. Available water capacity and organic matter content are moderate. The potential for frost action also is moderate.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, to habitat for openland wildlife, and to use as a site for dwellings. It is moderately well suited to hay and pasture. It is poorly suited to use as a site for septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, erosion and soil blowing are hazards. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Planting field windbreaks and leaving crop residue on the surface help to control soil blowing.

If this soil is used as a site for septic tank absorption fields, the rapid permeability is a limitation. The pollution of ground water is a hazard because the soil readily absorbs but does not adequately filter the effluent. Tests of wells for contamination are needed on a regular basis.

The land capability classification is IIe.

151—Ridgeville fine sandy loam. This nearly level, somewhat poorly drained soil is on outwash ridges. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is very dark gray, very friable fine sandy loam about 12 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is dark brown, friable loam, and the lower part is yellowish brown, very friable, stratified loamy sand and sandy loam. The substratum to a depth of 60 inches or more is mottled light brownish gray and yellowish brown, very friable, stratified sandy loam, loamy sand, and sand. In some areas the subsoil has more clay. In other areas depth to the seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Selma soils. These soils are in lower positions than those of the Ridgeville soil. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Ridgeville soil at a moderate rate and through the lower part at a moderately rapid rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is moderate. Organic matter content also is moderate. The potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, soil blowing is a hazard and the moderate available water capacity is a limitation. Field windbreaks and a conservation tillage system that leaves crop residue on the surface help to control soil blowing and conserve soil moisture.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Installing underground drains lowers the water table.

The land capability classification is IIs.

152—Drummer silty clay loam. This nearly level, poorly drained soil is on outwash plains and till plains. It is ponded for brief periods. Individual areas are irregular in shape and range from 2 to more than 10,000 acres in size.

Typically, the surface soil is black, friable silty clay loam about 16 inches thick. The subsoil is mottled, friable silty clay loam about 39 inches thick. The upper part is dark grayish brown, and the lower part is grayish brown. The substratum to a depth of 60 inches or more is mottled grayish brown, gray, and yellowish brown, friable, stratified silty clay loam and loam. In some areas the subsoil has more clay. In other areas depth to the seasonal high water table is more than 2 feet. In places carbonates are within a depth of 40 inches.

Included with this soil in mapping are small areas of the very poorly drained Peotone soils. These soils are ponded for long periods and are in depressions below the Drummer soil. They make up 2 to 10 percent of the unit.

Water and air move through the Drummer soil at a moderate rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is very high. Organic matter content is high. The surface layer is friable, but it becomes compact and cloddy if plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table by installing surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage

caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard. Installing surface and subsurface drains lowers the seasonal high water table. Adding several feet of permeable fill material increases the depth to the water table.

The land capability classification is IIw.

153—Pella silty clay loam. This nearly level, poorly drained soil is on lake plains. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to 10,000 acres in size.

Typically, the surface soil is black, friable silty clay loam about 12 inches thick. The subsoil is about 30 inches thick. It is friable. The upper part is grayish brown silty clay loam. The next part is grayish brown, mottled, calcareous silty clay loam. The lower part is gray, mottled, calcareous silty clay loam and silt loam. The substratum to a depth of 60 inches or more is gray, mottled, friable, calcareous, stratified silt loam, sandy loam, and loam. In some areas the soil is deeper to calcareous material. In other areas the subsoil and substratum have more sand. In places the subsoil has more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Ridgeville soils. These soils are in higher positions than those of the Pella soil. Also, they have a lower available water capacity. They make up 2 to 5 percent of the unit.

Water and air move through the Pella soil at a moderate rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is very high. Organic matter content is high. The surface soil is friable, but it is compact and cloddy if plowed when too wet. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table by installing surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard. Installing surface and subsurface drains lowers the seasonal high water table. Also, adding several feet of permeable fill material increases the depth to the seasonal high water table.

The land capability classification is IIw.

189—Martinton silt loam. This nearly level, somewhat poorly drained soil is on rises on lake plains. Individual areas are irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark gray, firm silty clay loam about 5 inches thick. The subsoil is about 36 inches thick. It is mottled. The upper part is brown, firm silty clay loam. The next part is grayish brown, firm silty clay. The lower part is dark grayish brown, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is mottled gray and light olive brown, firm, calcareous, stratified silt loam and silty clay loam. In some areas the surface layer is thinner and lighter in color because of erosion. In other areas the subsoil has less clay. In some places the slope is more than 2 percent. In other places very firm, calcareous silty clay is within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Milford soils. These soils are in slightly lower positions than those of the Martinton soil. They make up 5 to 10 percent of the unit.

Water and air move through the Martinton soil at a moderately slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, the seasonal high water table is a limitation. Installing a drainage system lowers the water table and improves soil productivity. Surface drains and subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where the slopes are very long. A conservation tillage system that leaves crop residue on the surface after planting and contour farming help to control erosion. Grassed waterways remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Installing subsurface drains lowers the water table. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IIw.

192—Del Rey silt loam. This nearly level, somewhat poorly drained soil is on slightly convex rises on lake plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is light brownish gray, friable silt loam about 6 inches thick. The subsoil is about 38 inches thick. It is mottled. The upper part is dark yellowish brown, friable silty clay loam. The next part is dark yellowish brown, firm silty clay and silty clay loam. The lower part is grayish brown, firm silty clay loam. The substratum to a depth of 60 inches or more is grayish brown, mottled, firm, calcareous silty clay. In some areas the surface layer is darker. In other areas the substratum has less clay.

Included with this soil in mapping are small areas of the poorly drained Milford soils. These soils are ponded for brief periods and are in slightly lower positions than those of the Del Rey soil. They make up 2 to 10 percent of the unit.

Water and air move through the Del Rey soil at a slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The surface layer is friable, but it tends to crust after rains. The shrink-swell potential is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed. Surface and subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where slopes are very long. A conservation tillage system that leaves crop residue on the surface after planting or contour farming helps to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around the foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material improves the absorption of liquid waste.

The land capability classification is IIw.

194B—Morley silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges on till plains. Individual areas are irregular in shape and range from 3 to 10 acres in size.

Typically, the surface soil is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 32 inches thick. The upper part is brown, friable silt loam and firm silty clay loam. The next part is olive brown, mottled, firm silty clay. The lower part is olive brown, mottled, firm silty clay loam. The substratum to a depth of 60 inches or more is mottled light olive brown, light olive gray, and olive brown, firm, calcareous silty clay loam. In some areas the surface layer is darker. In other areas the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Ashkum and somewhat poorly drained Blount soils. These soils are in slightly lower positions than those of the Morley soil. They make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Morley soil at a moderately slow rate and through the lower part at a slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is moderate. Organic matter content also is moderate. The surface layer is friable but tends to crust after rains. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately well suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soi or regularly adding other organic material helps to prevent surface crusting and to improve soil tilth and soil fertility.

In the areas used for pasture, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and control erosion. Leaving unmowed strips, 30 to 50 feet wide, at the edge of hayland provides excellent nesting cover for openland wildlife.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Enlarging the absorption field or replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIe.

223B2—Varna silt loam, 1 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on side slopes and ridgetops on till plains and moraines. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark gray and dark yellowish brown, friable silt loam about 12 inches thick. It has been mixed during cultivation with the upper part of the subsoil. The subsoil is about 27 inches thick. It is firm. The upper part is dark yellowish brown silty clay loam. The next part is olive brown, mottled silty clay. The lower part is olive brown, mottled, calcareous silty clay loam. The substratum to a depth of 60 inches or more is mottled light olive brown, light gray, and yellowish brown, firm, calcareous silty clay loam. In some areas the surface layer has not been mixed with the upper part of the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Elliott soils. These soils are in slightly lower positions than those of the Varna soil. They make up 2 to 10 percent of the unit.

Water and air move through the Varna soil at a slow or moderately slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 3 to 6 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wi dlife. It is moderately well suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow or slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Installing both surface and subsurface drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIe.

230—Rowe silty clay loam. This nearly level and depressional, poorly drained soil is in low areas on till plains and moraines. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to more than 1,000 acres in size.

Typically, the surface layer is black, friable silty clay loam about 14 inches thick. The subsurface layer is black, mottled, friable silty clay about 6 inches thick. The subsoil is olive gray, mottled, firm silty clay about 32 inches thick. It is calcareous in the lower part. The substratum to a depth of 60 inches or more is olive gray, mottled, very firm, calcareous silty clay. In some areas the subsoil has less clay. In other areas depth to

the seasonal high water table is more than 1 foot. In places the subsoil is dark to a depth of more than 24 inches.

Included with this soil in mapping are small areas of the very poorly drained Rantoul soils. These soils are ponded for long periods and are in depressions below the Rowe soil. They make up 2 to 10 percent of the unit.

Water and air move through the Rowe soil at a very slow rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above the surface to 1.0 foot below. Available water capacity is moderate. Organic matter content is high. The surface layer is friable, but it becomes compact and cloddy if plowed when too wet. The shrink-swell potential is high, and the potential for frost action is moderate.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, ponding and the seasonal high water table delay planting, cause damage to crops, and reduce productivity. Surface drains and ditches help to remove excess surface water. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table by installing surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard and the very slow permeability is a limitation. Installing surface and subsurface drains helps to lower the water table. Adding several feet of more permeable fill increases the depth to the seasonal high water table. Also, replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIIw.

232—Ashkum silty clay loam. This nearly level, poorly drained soil is in low areas on till plains and moraines. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to more than 1,000 acres in size.

Typically, the surface layer is black, friable silty clay loam about 11 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 4 inches thick. The subsoil is about 30 inches thick. It is mottled. The upper part is dark grayish brown, friable silty clay loam. The next part is gray, firm silty clay. The lower part is gray, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is gray, mottled, firm, calcareous silty clay loam. In some areas depth to the seasonal high water table is more than 2 feet. In other areas the subsoil is dark to a depth of more than 24 inches.

Water and air move through this soil at a moderately slow rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 1 foot above the surface to 2 feet below. Available water capacity is high. Organic matter content also is high. The surface layer is friable, but it is compact and cloddy if it has been plowed when wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table by installing surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard and the moderately slow permeability is a limitation. Installing surface and subsurface drains helps to lower the seasonal high water table. Adding several feet of more permeable fill material increases the depth to the water table. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IIw.

235—Bryce silty clay loam. This nearly level, poorly drained soil is on till plains and moraines. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to more than 1,000 acres in size.

Typically, the surface layer is black, friable and firm silty clay loam about 12 inches thick. The subsurface layer is very dark gray, firm silty clay about 5 inches thick. The subsoil is mottled silty clay about 33 inches

thick. The upper part is dark grayish brown and firm. The next part is gray and firm. The lower part is gray and very firm. The substratum to a depth of 60 inches or more is gray, mottled, very firm, calcareous silty clay. In some areas, the subsoil is thicker and the soil is deeper to calcareous silty clay. In other areas depth to the seasonal high water table is more than 1 foot.

Included with this soil in mapping are small areas of the very poorly drained Rantoul soils. These soils are ponded for long periods and are in depressions below the Bryce soil. They make up 2 to 10 percent of the unit.

Water and air move through the Bryce soil at a slow rate. In cultivated areas surface runoff is slow to ponded. The seasonal high water table ranges from 1 foot above the surface to 1 foot below. Available water capacity is moderate. Organic matter content is high. The surface layer is friable, but it is compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture. It is moderately well suited to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

If this soil is used as a site for dwellings, the ponding is a hazard and the shrink-swell potential is a limitation. Lowering the water table by installing surface and subsurface drains helps to control ponding. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a hazard and the slow permeability is a limitation. Installing surface and subsurface drains helps to lower the seasonal high water table. Adding several feet of more permeable fill increases the depth to the seasonal high water table. Also, replacing the soil with more permeable fill improves the absorption of liquid waste.

The land capability classification is IIw.

238—Rantoul silty clay. This nearly level, very poorly drained soil is in depressions on till plains and lake plains. It is ponded for brief periods. Individual areas are irregular in shape and range from 3 to 25 acres in size.

Typically, the surface layer is black, friable silty clay about 8 inches thick. The subsurface layer is black, firm silty clay about 5 inches thick. The subsoil is firm, mottled silty clay about 35 inches thick. The upper part is black, and the lower part is olive yellow, yellowish brown, and light olive gray. The substratum to a depth of 60 inches or more is mottled gray, yellowish brown, and light olive gray, firm, calcareous silty clay. In some areas the surface layer is thinner. In other areas the subsoil has less clay.

Water and air move through this soil at a very slow rate. In cultivated areas surface runoff is very slow or ponded. The seasonal high water table ranges from 0.5 foot above the surface to 2.0 feet below. Available water capacity is moderate. Organic matter content is high. The surface layer is friable, but it is compact and cloddy if plowed when too wet. The shrink-swell potential is high, and the potential for frost action is moderate.

In most areas this soil is used for cultivated crops. It is moderately suited to cultivated crops, hay, and pasture. It is well suited to habitat for openland and wetland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of the ponding.

In areas of this soil used for corn, soybeans, or small grain, the ponding and the seasonal high water table delay planting, damage crops, and reduce productivity. Surface drains and ditches help to remove excess surface water. Minimizing tillage and returning crop residue to the soil improve soil tilth.

The land capability classification is IIIw.

241C—Chatsworth silty clay, 4 to 10 percent slopes. This moderately sloping, moderately well drained soil is on severely eroded side slopes on till plains and moraines. Individual areas are irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is dark grayish brown, firm, calcareous silty clay about 5 inches thick. The subsoil is olive, mottled, calcareous silty clay about 13 inches thick. The upper part is firm, and the lower part is very firm. The substratum to a depth of 60 inches or more is light olive brown, mottled, very firm, calcareous silty clay. In some areas the surface layer is thicker and darker. In other areas depth to the seasonal high water table is less than 6 feet. In places the slope is less than 4 or more than 10 percent.

Water and air move through this soil at a very slow rate. In cultivated areas surface runoff is rapid. Available water capacity is very low. Organic matter content is low. The depth of root penetration is limited.

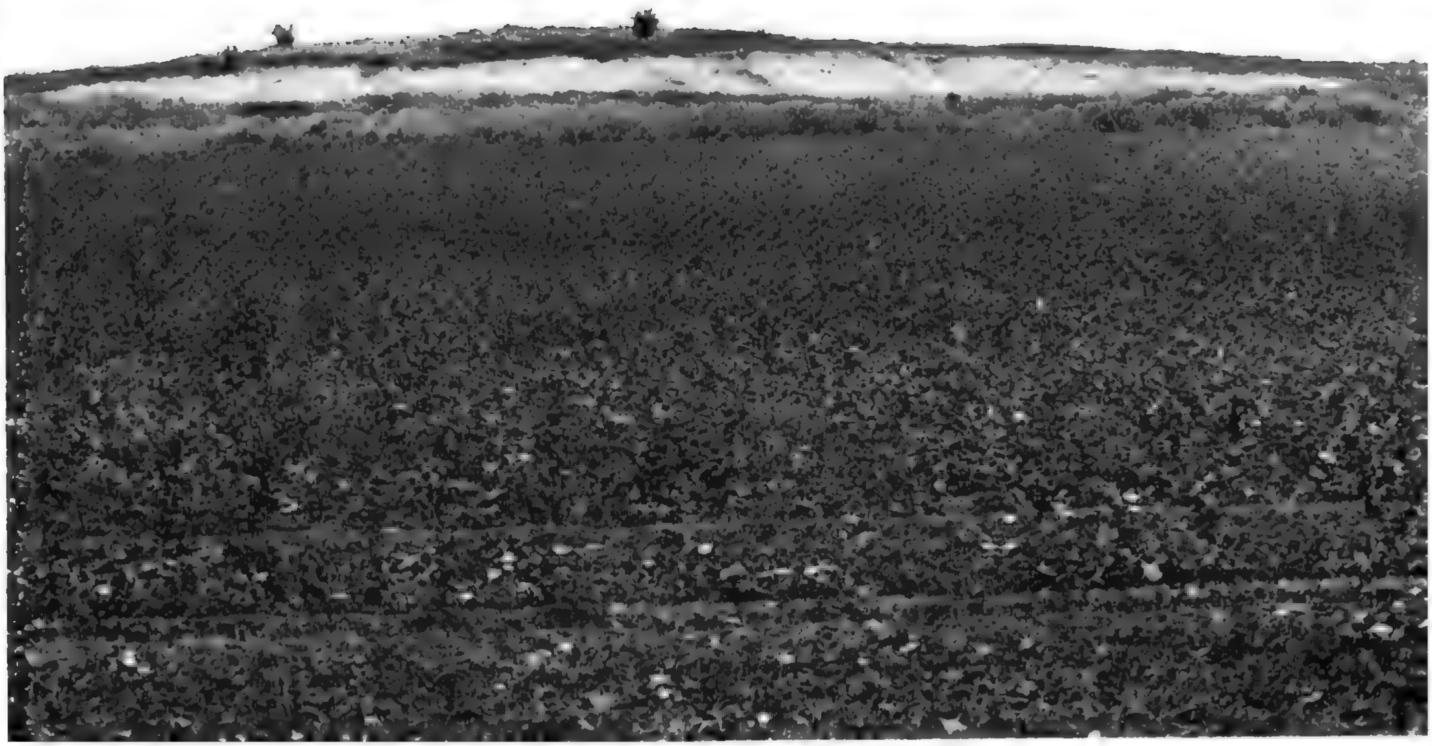


Figure 6.—A severely eroded area of Chatsworth silty clay, 4 to 10 percent slopes, on a knob.

Tilth is poor in the surface layer. This layer is compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used for cultivated crops. It is generally unsuited to cultivated crops because of a severe erosion hazard (fig. 6). It is poorly suited to hay and pasture and to habitat for openland wildlife. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

Establishing hay or pasture plants on this soil helps to keep erosion within tolerable limits. Deferred grazing helps to prevent surface compaction and excessive runoff. Tilling on the contour when a seedbed is prepared helps to control erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the very slow permeability is a limitation. Replacing the soi with more permeable fill improves the absorption of liquid waste.

The land capability classification is VIe.

294B—Symerton silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on ridges on till plains and moraines. Individual areas are irregular in shape and range from 3 to 10 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsoil is about 26 inches thick. The upper part is brown, friable gravelly clay loam. The next part is dark yellowish brown and brown, mottled, friable gravelly clay loam. The lower part is olive, mottled, firm, calcareous silty clay loam. The substratum to a depth of 60 inches or more is olive, mottled, very firm, calcareous si ty clay loam. In some areas the surface layer is lighter in color because of erosion. In other areas the upper part of the subsoil has more clay and less sand.

Water and air move through the upper part of this soil at a moderate rate and through the lower part at a moderately slow rate. In cultivated areas surface runoff

is medium. The seasonal high water table is at a depth of 3.5 to 6.0 feet. Available water capacity and organic matter content are moderate. The shrink-swell potential and the potential for frost action also are moderate.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is moderately suited to use as a site for dwellings and poorly suited to use as a site for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing tile drains around foundations lowers the water table.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IIe.

330—Peotone silty clay loam. This nearly level, very poorly drained soil is in shallow depressions on till plains, outwash plains, and lake plains. It is ponded for brief periods. Individual areas are round or oval and range from 3 to 60 acres in size.

Typically, the surface soil is black, friable silty clay loam about 13 inches thick. The subsoil is about 37 inches thick. The upper part is black, friable silty clay loam, and the lower part is dark gray, mottled, firm silty clay. The substratum to a depth of 60 inches or more is dark gray, mottled, firm, calcareous silty clay loam. In some areas the surface soil is thinner. In other areas the surface soil and subsoil have less clay.

Included with this soil in mapping are small areas of soils that are ponded for long periods during the growing season. These soils make up less than 5 percent of the unit.

Water and air move through the Peotone soil at a moderately slow rate. In cultivated areas surface runoff is very slow or ponded. The seasonal high water table ranges from 0.5 foot above the surface to 1.0 foot below. Available water capacity is high. Organic matter content also is high. The surface layer is friable, but it becomes compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops and to habitat for wetland wildlife. It is moderately well suited to hay and pasture and poorly suited to habitat for openland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of the ponding.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains work well if suitable outlets are available. Minimizing tillage and returning crop residue to the soil improve soil tilth.

The land capability classification is IIw.

375B—Rutland silt loam, 1 to 5 percent slopes. This gently sloping, somewhat poorly drained soil is on rises on till plains and moraines. Individual areas are irregular in shape and range from 3 to 70 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 12 inches thick. The subsoil is about 35 inches thick. In sequence downward, it is brown, friable silt loam; dark yellowish brown, firm silty clay loam; brown, mottled, firm and friable silty clay loam; and light olive brown, mottled, very firm, calcareous silty clay. The substratum to a depth of 60 inches or more is grayish brown, mottled, very firm, calcareous silty clay. In some areas the surface soil is thinner and lighter in color because of erosion. In other areas the subsoil is thinner. In places the subsoil has less clay.

Included with this soil in mapping are small areas of the poorly drained Bryce and Rowe soils and the somewhat poorly drained Clarence soils. Bryce and Rowe soils are in slightly lower positions than those of the Rutland soil. Clarence soils have a low available water capacity and are in positions similar to those of the Rutland soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Rutland soil at a moderately slow rate and through the lower part at a slow rate. In cultivated areas surface runoff is medium. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity and organic matter content are high. The shrink-swell potential and the potential for frost action also are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and

to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the seasonal high water table and shrink-swell potential are limitations. Installing tile drains around the foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material improves the absorption of liquid waste.

The land capability classification is IIe.

405—Zook silty clay loam. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods. Individual areas are irregular in shape and range from 15 to several hundred acres in size.

Typically, the surface soil is black, friable silty clay loam about 25 inches thick. The subsoil is mottled, firm silty clay about 25 inches thick. The upper part is black, and the lower part is dark gray. The substratum to a depth of 60 inches or more is dark gray, firm, calcareous silty clay. In some areas the surface soil is thinner. In other areas the subsoil has less clay. In places the surface soil has more clay.

Water and air move through this soil at a slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content also is high. The surface soil is friable, but it is compact and cloddy if it has been plowed when wet. The shrink-swell potential and the potential for frost action are high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops. It is moderately suited to hay and pasture and to habitat for openland wildlife. It generally is unsuited to use as a site for dwellings and septic tank absorption fields because of the flooding.

If this soil is used for the crops commonly grown in the county, measures that maintain or improve the drainage system are needed in some areas. Tile drains and surface drains lower the seasonal high water table. Minimizing tillage and returning crop residue to the soil improve tilth.

If this soil is used for pasture and hay, the flooding is a hazard and the seasonal high water table is a limitation. Constructing dikes and diversions helps to control the flooding, and installing subsurface drains lowers the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

440B—Jasper loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on ridges on outwash plains and lake plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface soil s very dark brown, friable loam about 20 inches thick. The subsoil is about 32 inches thick. It is dark yellowish brown and friable. The upper part is clay loam. The next part is sandy loam. The lower part is stratified loam and clay loam. The substratum to a depth of 60 inches or more is yellowish brown, mottled, friable, stratified loam and silt loam. In some areas the surface soil is thinner. In other areas the subsoil has less sand and more silt.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue and poorly drained Drummer, Pella, and Selma soils. These soils are in lower positions than those of the Jasper soil. They make up 2 to 10 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. In cultivated areas surface runoff is medium. Available water capacity is high. Organic matter content is moderate. The potential for frost action also is moderate.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture, to habitat for openland wildlife, and to use as a site for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

The land capability classification is IIe.

481A—Raub silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on slight rises on till plains and moraines. Individual areas are

irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 6 inches thick. The subsoil is about 29 inches thick. It is mottled. The upper part is yellowish brown, friable silty clay loam. The lower part is light olive brown, friable and firm, calcareous silt loam. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous loam. In some areas the surface layer is thinner and lighter in color because of erosion. In other areas the upper part of the subsoil has more sand. In places the substratum has more sand.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in depressions below the Raub soil. They make up 2 to 6 percent of the unit.

Water and air move through the Raub soil at a moderately slow rate. In cultivated areas surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

In most areas this soil is used for cultivated crops. It is well suited to cultivated crops, hay, and pasture and to habitat for openland wildlife. It is poorly suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, a drainage system is needed to improve productivity. Subsurface drains work well if suitable outlets are available. Erosion is a hazard in areas where the slopes are more than 2 percent. A conservation tillage system that leaves crop residue on the surface after planting and contour farming help to control erosion. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate.

If this soil is used as a site for dwellings, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Installing underground drains lowers the water table. Enlarging the absorption field or replacing the soil with more permeable material improves the absorption of liquid waste.

The land capability classification is I.

495C3—Corwin clay loam, 5 to 10 percent slopes, severely eroded. This moderately sloping, moderately well drained soil is on ridges and side slopes in the uplands. In most areas, water erosion has removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is mixed dark brown and brown, friable clay loam about 8 inches thick. The subsoil is clay loam about 29 inches thick. It is mottled. The upper part is olive brown and friable. The lower part is light olive brown, firm, and calcareous. The substratum to a depth of 60 inches or more is light olive brown, mottled, firm, calcareous loam. In some areas the surface layer is thicker and darker. In other areas the slope is less than 5 percent or more than 10 percent. In places depth to the seasonal high water table is less than 4 feet.

Water and air move through the upper part of this soil at a moderate rate and through the lower part at a moderately slow rate. In cultivated areas surface runoff is rapid. The seasonal high water table is at a depth of 2 to 4 feet. Available water capacity is moderate. Organic matter content also is moderate. The surface layer is friable, but it becomes compact and cloddy if plowed when too wet. The shrink-swell potential and the potential for frost action are moderate.

In most areas this soil is used for cultivated crops. It is poorly suited to cultivated crops and well suited to hay and pasture and to habitat for openland wildlife. It is moderately suited to use as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, further erosion is a severe hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion and to maintain soil productivity. Constructing grassed waterways helps to remove excess surface water at a nonerosive rate. Returning crop residue to the soil or regularly adding other organic material improves soil tilth and soil fertility.

Establishing hay or pasture plants on this soil helps to keep erosion within tolerable limits. Deferred grazing helps to prevent surface compaction and excessive runoff. The pasture should be tilled on the contour when a seedbed is prepared.

If this soil is used as a site for dwellings with basements, the seasonal high water table is a limitation. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Installing tile drains

around foundations lowers the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and moderately slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table are needed. Enlarging the absorption field improves the absorption of liquid waste.

The land capability classification is IVe.

805—Orthents, clayey. These nearly level to strongly sloping, poorly drained to moderately well drained soils are in fill and borrow areas. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is mixed black and olive, friable silty clay loam. The substratum to a depth of 60 inches or more is mottled olive brown, greenish gray, olive, and very dark grayish brown, firm, calcareous silty clay.

Water and air move through these soils at a very slow rate. Surface runoff is slow in the nearly level areas and very rapid in the strongly sloping areas. The seasonal high water table is within a depth of 4 feet. Available water capacity is very low. Organic matter content is low. The shrink-swell potential is very high, and the potential for frost action is moderate.

Most areas are adjacent to roads. Some areas are near sites for dwellings and small commercial buildings. These soils are poorly suited to lawns and to use as sites for dwellings without basements and as sites for small commercial buildings. They generally are unsuited to use as sites for dwellings with basements and as sites for septic tank absorption fields because of the seasonal high water table, very slow permeability, and very high shrink-swell potential. Establishing a plant cover is difficult in the fill areas along roadways and railroads and in borrow areas.

If these soils are used as sites for dwellings without basements or for small commercial buildings, the shrink-swell potential and the seasonal high water table are limitations. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. The water table can be lowered by drainage ditches and by underground drains in coarse grained material around footings.

If the areas along roads are being revegetated or lawns are being seeded, the seasonal high water table, very low available water capacity, and high content of clay in the surface layer are limitations. The water table can be lowered by installing closely spaced underground drains. Adding fertilizer, planting suitable species, increasing mowing heights during the summer, and watering during extended dry periods help to overcome the very low available water capacity. Adding a layer of silty or loamy material improves the capacity for revegetation.

This map unit is not assigned a land capability classification.

865—Pits, gravel. This map unit consists of excavations from which gravel and a small amount of sand have been removed. It is generally on outwash plains, stream benches, or kames. The gravel is used mainly as roadfill or as fill material for other construction needs. Individual areas are square, rectangular, or irregular in shape and range from 2 to 50 acres in size.

The excavations commonly are 10 to 50 feet deep. Many are filled with water and are identified on the soil maps as water areas. The surrounding soil material generally was scraped or mixed during mining activities. It generally is low in fertility and organic matter content. Available water capacity differs from place to place.

Some abandoned pits can be filled with solid refuse and then covered with clean fill material. Before the fill is graded, time should be allowed for the fill to settle and become stable. Some areas can be reclaimed for recreational uses, such as hiking paths and trails and fishing areas, or for commercial and industrial uses. Topdressing generally is needed to establish vegetation. The feasibility of reclamation depends on the condition at the site and the proposed alternative use. Onsite investigation is needed to plan the development for a specific use.

This map unit is not assigned a land capability classification.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it

is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 300,000 acres in the survey area, or about 95 percent of the total acreage, meets the soil requirements for prime farmland. Scattered areas of this land are throughout the county, but most are in the southeastern part, mainly in association 1, which is described under the heading "General Soil Map Units." Nearly all of the prime farmland is used for crops. The crops grown on this land, mainly corn and soybeans, account for most of the county's total agricultural income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify for prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures. In Ford County most of the naturally wet soils have been adequately drained.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

J A Stika, soil scientist, Ford County, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 293,808 acres in Ford County is cropland, 7,333 acres is permanent pasture, and 1,397 acres is woodland. The rest of the land is used for roads, buildings, drainageways, or recreational areas *(12)*. The soils have good potential for crop production. This soil survey can be used as a valuable guide to the latest management techniques that increase food and fiber production.

A wide variety of field crops can be grown on the soils in the county, but many of these crops are not grown on a commercial scale. Corn and soybeans are the main crops. Ford County ranks in the top 25 counties in Illinois in total production of corn and soybeans. Wheat is the main close-growing crop. Oats and hay are grown on a small acreage.

The chief management needs in the county are measures that control water erosion and soil blowing, drain the wetter soils, conserve moisture in the more droughty soils, and maintain soil fertility and tilth.

Water erosion is a major problem on about 20 percent of the cropland and pasture in the county. It is a hazard on slopes of more than 2 percent and on slopes of less than 2 percent that are long or where runoff is concentrated.

Sheet erosion, or loss of the surface layer, is damaging for three reasons. First, as the topsoil is removed, valuable organic matter and plant nutrients are lost, resulting in a decrease in productivity. Second, soil tilth is reduced when a portion of the surface layer is eroded away and the more clayey subsoil is

incorporated into the surface layer by plowing. The result is a decreased rate of water infiltration, cloddiness if the soil is worked when wet, crusting after a hard rain, and an increased amount of stones in the surface layer. Under these conditions, preparing a good seedbed is difficult. Third, uncontrolled erosion allows sediment to enter lakes, ditches, streams, and other waterways. Removing this sediment is expensive, and the resulting pollution can make the water unsuitable for municipal and recreational uses.

Terraces, contour farming, conservation tillage, and crop rotations help to control erosion. They also increase the rate of water infiltration and reduce the runoff rate. Terraces are designed to shorten the length of a slope and are most effective on smooth, long slopes. Contour farming is accomplished by planting crops along the contour of sloping ground, essentially creating a series of miniature terraces.

A conservation tillage system that leaves crop residue on the surface throughout the year, such as no-till or chisel plowing, protects the soil from the impact of raindrops and the subsequent detachment and transportation of soil particles. No-till is most effective on moderately well drained and well drained soils. Till plant or ridge-plant systems are more effective on somewhat poorly drained soils.

Windbreaks reduce the hazard of soil blowing during the winter and early spring where bare soil is exposed. Maintaining a plant cover is also important. Leaving crop residue on the surface during winter or keeping the surface rough helps to hold the soil in place. Further information about erosion-control measures can be obtained from the Ford County Soil and Water Conservation District.

Another important factor in managing the soils is drainage (fig. 7). Most of the areas used for crops and pasture have been artificially drained. Drainage systems are most common in the poorly drained Ashkum, Bryce, Drummer, Milford, Pella, Sawmill, and Zook soils and the very poorly drained Peotone and Rantoul soils. Unless drained, somewhat poorly drained soils are wet enough in some years for crop growth and productivity to be reduced. Examples are Brenton, Elliott, Raub, and Swygert soils.

The design of surface and subsurface drainage systems varies with the kind of soil. Tile drains alone are inadequate in many soils. A combination of shallow surface drains and tile drains are needed in some areas of poorly drained and very poorly drained soils. Tile drains are not effective in Bryce, Swygert, Rowe, Clarence, Rantoul, and other slowly permeable or very slowly permeable soils unless surface inlets are used to drain wet spots. Moderately permeable and moderately slowly permeable soils can be adequately drained by tile if outlets are available.

Droughtiness limits yields on some of the soils used for crops and pasture. Chatsworth, Clarence, and the eroded Swygert soils, for example, have layers that restrict the penetration of plant roots. Crops grown in these soils are shallow rooted and show moisture stress earlier than crops grown in more permeable soils. Planting drought-tolerant species and reducing the runoff rate minimize droughtiness. A system of conservation tillage that leaves crop residue on the surface after planting reduces the runoff rate.

Soil fertility is naturally high in most soils in the county. Most of the dark soils are neutral in reaction, and most of the light colored soils, which formed under trees, are naturally acid. On most acid soils, applications of agricultural limestone raise the pH level high enough for optimum plant growth. Harpster soils should not be limed because they have accumulated carbonates in the surface layer.

Most of the light colored soils have a naturally low supply of nitrogen. Planting legumes, which take nitrogen from the air, and adding livestock waste help to replenish the nitrogen supply. Additions of lime, nitrogen, phosphorus, potassium, or other elements needed for optimum yields should be based on the results of soil tests. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime needed.

Soil tilth is an important factor influencing the germination of seeds, the amount of runoff, and the infiltration of water into the soil. Surface soil in good tilth is granular and porous. Poor tilth is a problem in the light colored, clayey Chatsworth soils; the dark colored, clayey Bryce, Clarence, Rowe, and Rantoul soils; and the sloping Varna soils. These soils often stay wet until late in spring. If plowed when wet, they tend to be very cloddy. As a result, preparing a good seedbed is difficult. Chisel plowing or tilling in fall generally results in good tilth in spring if crop residue is left on the surface.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and

Figure 7.—This drainage ditch lowers the seasonal high water table by removing excess surface water and by providing outlets for subsurface drains.

records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field tr als and demonstrations are also considered *(3)*.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and

limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit *(10)*. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excessive water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *L*, low strength. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and L.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil

wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water

impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-

producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian olive, autumn olive, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl-feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings

in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. Resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of

sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary

landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadf ll. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table,

rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to so l properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by fie d observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. So ls exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates

determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous, loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These

soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that is occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field

capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(11)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (9)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (11)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Ashkum Series

The Ashkum series consists of poorly drained, moderately slowly permeable soils on till plains and moraines. These soils formed in silty and clayey local wash and in the underlying silty and clayey glacial till. Slope ranges from 0 to 2 percent.

Ashkum soils are similar to Bryce and Milford soils and commonly are adjacent to Elliott, Peotone, and Varna soils. The somewhat poorly drained Elliott soils and the moderately well drained Varna soils have an argillic horizon and are in higher positions than those of Ashkum soils. Milford soils are stratified in the lower part of the solum. Peotone soils are cumulic and are in depressions below Ashkum soils. Bryce soils have more clay in the control section than Ashkum soils.

Typical pedon of Ashkum silty clay loam, 150 feet north and 1,469 feet west of the southeast corner of sec. 1, T. 24 N., R. 7 E.

Ap—0 to 11 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; neutral; clear smooth boundary.

AB—11 to 15 inches; very dark grayish brown (2.5Y 3/2) silty clay loam, grayish brown (2.5Y 5/2) dry; moderate fine angular blocky structure parting to moderate very fine angular blocky; friable; neutral; clear smooth boundary.

Bg1—15 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine angular blocky structure parting to moderate very fine angular blocky; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

2Bg2—23 to 29 inches; gray (10YR 5/1) silty clay; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate medium angular blocky; firm; few fine pebbles; neutral; clear smooth boundary.

2Bg3—29 to 41 inches; gray (10YR 5/1) silty clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few fine pebbles; mildly alkaline; clear smooth boundary.

2BCg—41 to 45 inches; gray (10YR 5/1) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few fine white accumulations of calcium carbonate; slight effervescence; few fine pebbles; moderately alkaline; clear smooth boundary.

2Cg—45 to 60 inches; gray (5Y 6/1) silty clay loam; few medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; few fine pebbles; slight effervescence; moderately alkaline.

The solum ranges from 31 to 60 inches in thickness. The overlying local wash ranges from 20 to 40 inches in thickness. The mollic epipedon ranges from 10 to 24 inches in thickness.

The Ap horizon has hue of 10YR or is neutral. It has value of 2 or 3 and chroma of 1 or 0. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 2 or less. It is silty clay loam and silty clay. The 2Bg horizon has hue of 2.5Y, 5Y, or 10YR, value of 4 to 6, and chroma of 2 or less. It is silty clay loam or silty clay. The clay content in the control section ranges from 35 to 45 percent. The 2Bg horizon is slightly acid to moderately alkaline. Reaction commonly increases with increasing depth. The 2Cg horizon is mildly alkaline or moderately alkaline.

Blount Series

The Blount series consists of somewhat poorly drained, slowly permeable soils on till plains and moraines. These soils formed in loess and in the underlying silty clay loam glacial till. Slope ranges from 0 to 3 percent.

Blount soils are similar to Del Rey soils and commonly are adjacent to Ashkum and Morley soils. The poorly drained Ashkum soils have a mollic epipedon and are in drainageways and in depressions below Blount soils. Del Rey soils formed in clayey lacustrine sediments. The moderately well drained Morley soils are in slightly higher positions than those of Blount soils.

Typical pedon of Blount silt loam, 0 to 3 percent slopes, 370 feet north and 1,450 feet east of the southwest corner of sec. 36, T. 23 N., R. 10 E.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; medium acid; abrupt smooth boundary.

E—9 to 12 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; few fine distinct light yellowish brown (10YR 6/4) mottles; moderate very fine angular blocky structure; very friable; strongly acid; clear wavy boundary.

2Bt1—12 to 20 inches; light yellowish brown (10YR 6/4) silty clay; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine angular blocky structure; firm; many prominent grayish brown

(10YR 5/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt2—20 to 27 inches; light olive brown (2.5Y 5/4) silty clay; few fine distinct yellowish brown (10YR 5/4) and distinct light brownish gray (2.5Y 6/2) mottles; moderate fine angular blocky structure; firm; common prominent grayish brown (10YR 5/2) clay films on faces of peds; slightly acid; clear wavy boundary.

2Bt3—27 to 33 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/4) and distinct grayish brown (2.5Y 5/2) mottles; moderate fine prismatic structure; firm; common faint dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) clay films on faces of peds; neutral; clear wavy boundary.

2BC—33 to 43 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium prismatic structure; firm; few faint dark grayisn brown (10YR 4/2) clay films on faces of peds; strong effervescence; mildly alkaline; clear smooth boundary.

2C—43 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; few fine distinct grayish brown (2.5Y 5/2) mottles; massive; firm; strong effervescence; moderately alkaline.

The solum ranges from 43 to 48 inches in thickness. The depth to free carbonates ranges from 27 to 40 inches. The clay content in the control section ranges from 35 to 48 percent.

The Ap or A horizon has value of 2 to 4 and chroma of 1 or 2. The E horizon is strongly acid to slightly acid. The 2Bt horizon has value of 4 to 6 and chroma of 2 to 4. It is very strongly acid to neutral. The 2C horizon is mildly alkaline or moderately alkaline.

Brenton Series

The Brenton series consists of somewhat poorly drained, moderately permeable soils on outwash plains. These soils formed in loess and in the underlying silty and loamy glacial outwash. Slope ranges from 0 to 2 percent.

Brenton soils are similar to La Hogue and Raub soils and commonly are adjacent to Drummer and Proctor soils. The poorly drained Drummer soils do not have an argillic horizon and are in drainageways below Brenton soils. La Hogue soils have more sand in the control section than Brenton soils. The well drained Proctor soils are in higher positions than those of Brenton soils. Raub soils formed in loess and the underlying glacial till.

Typical pedon of Brenton silt loam, 105 feet north and 825 feet east of the southwest corner of sec. 19, T. 23 N., R. 7 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate very fine and fine granular structure; friable; medium acid; abrupt smooth boundary.

A—9 to 14 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; medium acid; clear smooth boundary.

Bt1—14 to 18 inches; brown (10YR 5/3) silty clay loam; few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate fine and medium subangular blocky structure; firm; many distinct grayish brown (10YR 5/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—18 to 26 inches; brown (10YR 5/3) silty clay loam; common fine distinct light brownish gray (2.5Y 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; many distinct grayish brown (10YR 5/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—26 to 34 inches; yellowish brown (10YR 5/4) silt loam; common medium faint yellowish brown (10YR 5/6), many medium prominent gray (5Y 5/1), and common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common distinct grayish brown (10YR 5/2) clay films and common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt wavy boundary.

2Bt4—34 to 48 inches; yellowish brown (10YR 5/4) clay loam; common medium faint yellowish brown (10YR 5/6) and common fine distinct light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure; friable; few faint brown (10YR 4/3) clay films on faces of peds; about 20 percent gravel in some strata; neutral; gradual smooth boundary.

2C—48 to 60 inches; mottled yellowish brown (10YR 5/4 and 5/6) and light brownish gray (2.5Y 6/2), stratified sandy loam and gravelly sandy loam; massive; friable; slight effervescence; mildly alkaline.

The solum ranges from 39 to 48 inches in thickness. The depth to free carbonates is more than 40 inches. The mollic epipedon ranges from 10 to 18 inches in thickness.

The Ap and A horizons have value of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is medium acid to neutral. The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 8. It is stratified clay loam, silt loam, and loam and has thin strata of the gravelly analog of those textures. It is medium acid to mildly alkaline. The clay content in the control section ranges from 25 to 35 percent. The 2C horizon is stratified loam, sandy loam, silt loam, or the gravelly analog of those textures. It is medium acid to moderately alkaline.

Bryce Series

The Bryce series consists of poorly drained, slowly permeable soils on till plains and moraines. These soils formed in silty and clayey local wash and in the underlying silty clay glacial till. Slope ranges from 0 to 2 percent

Bryce soils are s m lar to Ashkum and M lford soils and commonly are adjacent to Milford, Rantoul, and Swygert soils. Ashkum and Milford soils have less clay in the control section than Bryce soils. Milford soils are in positions similar to those of Bryce soils. The very poorly drained Rantoul soils are cumulic and are in depressions below Bryce soils. The somewhat poorly drained Swygert soils are in slightly higher positions than those of Bryce soils.

Typical pedon of Bryce silty clay loam, 395 feet north and 125 feet west of the southeast corner of sec. 3, T. 23 N., R. 10 E.

Ap1—0 to 5 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate very fine granular structure; friable; neutral; abrupt smooth boundary.

Ap2—5 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine granular structure; firm; angular blocky compacted clods; slightly acid; abrupt smooth boundary.

AB—12 to 17 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; strong very fine and fine granular structure; firm; many faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Btg1—17 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate very fine angular blocky structure; firm; many distinct dark gray (5Y 4/1) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Btg2—24 to 32 inches; dark grayish brown (2.5Y 4/2) silty clay; common fine faint olive brown (2.5Y 4/4), few fine prominent yellowish brown (10YR 5/4), and few fine prominent gray (5Y 5/1) mottles; moderate very fine and fine prismatic structure parting to moderate very fine and fine angular blocky; firm; common faint dark gray (5Y 4/1) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); mildly alkaline; clear smooth boundary.

2Bg—32 to 43 inches; gray (5Y 5/1) silty clay; many fine prominent yellowish brown (10YR 5/4) mottles; moderate fine and medium prismatic structure parting to moderate fine and medium angular blocky; firm; common gray (5Y 5/1) pressure faces; mildly alkaline; gradual smooth boundary.

2BCg—43 to 50 inches; gray (5Y 5/1) silty clay; many medium prominent dark yellowish brown (10YR 4/4) and many fine prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; very firm; common gray (5Y 5/1) pressure faces; mildly alkaline; gradual smooth boundary.

2Cg—50 to 60 inches; gray (5Y 5/1) silty clay; many medium prominent dark yellowish brown (10YR 4/4) mottles; massive; very firm; common gray (5Y 5/1) pressure faces; slight effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 30 to 60 inches. The mollic epipedon ranges from 10 to 22 inches in thickness.

The Ap horizon has hue of 10YR or is neutral. It has value of 2 or 3 and chroma of 0 or 1. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 or 2. It is neutral or mildly alkaline. The 2Bg horizon has chroma of 1 or 2. It is neutral to moderately alkaline. The clay content in the control section ranges from 42 to 52 percent. The 2Cg horizon is clay, silty clay, or silty clay loam. It is mildly alkaline or moderately alkaline.

Camden Series

The Camden series consists of well drained, moderately permeable soils on outwash plains. These soils formed in loess and in the underlying loamy glacial outwash. Slope ranges from 0 to 3 percent.

Camden soils are similar to Jasper and Proctor soils and commonly are adjacent to Del Rey, Drummer, Milford, and Sawmill soils. Jasper and Proctor soils have a mollic epipedon. In addition, Jasper soils have more sand in the control section than Camden soils. The somewhat poorly drained Del Rey soils have more clay in the subsoil than Camden soils and are in slightly lower positions. The poorly drained Drummer, Milford, and Sawmill soils are in low areas below Camden soils.

Typical pedon of Camden silt loam, 0 to 3 percent slopes, 890 feet south and 2,305 feet east of the northwest corner of sec. 8, T. 23 N., R. 9 E.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; moderate very fine and fine granular structure; friable; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

BE—8 to 13 inches; dark brown (10YR 4/3) silt loam; weak fine prismatic structure parting to moderate very fine and fine angular blocky; friable; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—13 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong medium prismatic structure parting to strong fine and medium angular blocky; firm; many faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—20 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong medium prismatic structure parting to strong medium angular blocky; firm; many faint dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—30 to 38 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint brown (10YR 5/3) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common faint dark brown (10YR 4/3) clay films on faces of peds; neutral; abrupt smooth boundary.

2Bt4—38 to 56 inches; dark yellowish brown (10YR 4/4) clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark brown (10YR 4/3) clay films on faces of peds; about 15 percent gravel in some strata; slightly acid; gradual smooth boundary.

2C—56 to 60 inches; mottled yellowish brown (10YR 5/6) and brown (10YR 5/3), stratified sandy loam and gravelly sandy loam; massive; friable; neutral.

The solum ranges from 43 to 60 inches in thickness. The Bt horizon has value of 4 or 5. It is medium acid to neutral. The 2Bt horizon has value of 4 or 5. It is clay loam, loam, or sandy loam and has thin strata of the gravelly analog of those textures. Some pedons do not have gravelly textures. The clay content in the control section ranges from 18 to 35 percent. The 2C horizon has value of 4 or 5 and chroma of 3 to 6. It is stratified sandy loam, loam, or silt loam and has thin strata of the gravelly analog of those textures. It is medium acid to moderately alkaline.

Chatsworth Series

The Chatsworth series consists of moderately well drained, very slowly permeable soils on till plains and moraines. These soils formed in silty clay or silty clay loam glacial till. Slope ranges from 4 to 10 percent.

Chatsworth soils commonly are adjacent to Clarence, Elliott, Swygert, and Zook soils. The somewhat poorly drained Clarence, Elliott, and Swygert soils have a mollic epipedon and are in the less sloping areas above Chatsworth soils. The poorly drained Zook soils are on flood plains below the Chatsworth soils.

Typical pedon of Chatsworth silty clay, 4 to 10 percent slopes, 236 feet south and 272 feet east of the northwest corner of sec. 29, T. 26 N., R. 9 E.

Ap—0 to 5 inches; dark grayish brown (2.5Y 4/2) silty clay, light brownish gray (2.5Y 6/2) dry; moderate fine angular blocky structure; firm; strong effervescence; moderately alkaline; clear smooth boundary.

Bt—5 to 13 inches; olive (5Y 4/3) silty clay; few fine distinct gray (5Y 5/1) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; strong effervescence; moderately alkaline; clear smooth boundary.

BC—13 to 18 inches; olive (5Y 5/3) silty clay; common fine distinct gray (5Y 5/1) mottles; moderate fine prismatic structure; very firm; strong effervescence; moderately alkaline; gradual smooth boundary.

C—18 to 60 inches; light olive brown (2.5Y 5/4) silty clay; many fine prominent gray (5Y 5/1) mottles; massive; very firm; strong effervescence; moderately alkaline.

The solum ranges from 18 to 24 inches in thickness. Free carbonates are within a depth of 18 inches.

The A or Ap horizon has hue of 10YR or 2.5Y and value of 3 or 4. The Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2 or 3. It is

dominantly silty clay but in some pedons is silty clay loam. It generally is mildly alkaline or moderately alkaline, but some pedons have subhorizons that are slightly acid. The C horizon is dominantly silty clay but in some pedons is silty clay loam. It is mildly alkaline or moderately alkaline.

Clarence Series

The Clarence series consists of somewhat poorly drained, very slowly permeable soils on till plains and moraines. These soils formed in a thin layer of loess and in the underlying silty clay or clay glacial till. Slope ranges from 0 to 5 percent.

Clarence soils are similar to Swygert soils and commonly are adjacent to Chatsworth, Rowe, and Rutland soils. The moderately well drained Chatsworth soils are on steeper side slopes than those of Clarence soils. The poorly drained Rowe soils are in shallow depressions and drainageways below Clarence soils. Rutland and Swygert soils have less clay in the control section than Clarence soils and have a thicker solum. They are in positions similar to those of Clarence soils.

Typical pedon of Clarence silty clay loam, 0 to 2 percent slopes, 1,837 feet south and 624 feet west of the northeast corner of sec. 1, T. 24 N., R. 9 E.

Ap—0 to 11 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

2Bt1—11 to 16 inches; olive brown (2.5Y 4/4) silty clay; few fine prominent dark yellowish brown (10YR 4/4) mottles; moderate fine angular blocky structure; firm; common prominent very dark gray (10YR 3/1) organic coatings and few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt2—16 to 21 inches; olive brown (2.5Y 4/4) silty clay; few fine prominent olive gray (5Y 5/2) and dark yellowish brown (10YR 4/4) mottles; moderate fine angular blocky structure; firm; common prominent very dark gray (10YR 3/1) organic coatings and common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

2Bt3—21 to 30 inches; light olive brown (2.5Y 5/4) silty clay; few fine prominent greenish gray (5GY 6/1) and common fine prominent dark yellowish brown (10YR 4/4) mottles; moderate fine and medium prismatic structure; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slight effervescence; mildly alkaline; clear smooth boundary.

2BC—30 to 34 inches; olive brown (2.5Y 4/4) silty clay; common fine prominent dark yellowish brown (10YR 4/4) and few fine prominent grayish brown (2.5Y 5/2) and greenish gray (5GY 6/1) mottles; moderate medium prismatic structure; very firm; few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions (calcium carbonate); strong effervescence; moderately alkaline; clear smooth boundary.

2C—34 to 60 inches; olive brown (2.5Y 4/4) silty clay; common fine prominent dark yellowish brown (10YR 4/4) and few fine prominent olive gray (5Y 5/2) mottles; massive; very firm; strong effervescence; moderately alkaline.

The solum ranges from 25 to 38 inches in thickness. The depth to free carbonates ranges from 20 to 30 inches. The mollic epipedon is 10 to 12 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is silty clay loam or silt loam in uneroded pedons and ranges to silty clay in eroded pedons. The 2Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is medium acid to moderately alkaline. The clay content in the control section ranges from 50 to 60 percent. The C horizon is silty clay or clay.

The dark surface layer of Clarence silty clay, 2 to 5 percent slopes, eroded, is thinner than is definitive for the Clarence series. This difference, however, does not significantly alter the usefulness or behavior of the soil.

Corwin Series

The Corwin series consists of moderately well drained soils on till plains and moraines. These soils are moderately permeable in the subsoil and moderately slowly permeable in the underlying material. They formed in loamy or silty glacial till. Slope ranges from 5 to 10 percent.

The Corwin soils in this survey area have a thinner and lighter colored surface layer than is definitive for the Corwin series. This difference, however, does not significantly alter the usefulness or behavior of the soils.

Corwin soils commonly are adjacent to Dana and Raub soils. The moderately well drained Dana soils and the somewhat poorly drained Raub soils formed in loess and glacial till. They have a solum that is thicker than that of the Corwin soils and are in less sloping and less eroded areas.

Typical pedon of Corwin clay loam, 5 to 10 percent slopes, severely eroded, 145 feet north and 1,100 feet west of the southeast corner of sec. 19, T. 24 N., R. 7 E.

Ap—0 to 8 inches; mixed brown (10YR 4/3) and dark brown (10YR 3/3) clay loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; few pebbles; strongly acid; abrupt smooth boundary.

Bt1—8 to 15 inches; olive brown (2.5Y 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) organic coatings on faces of peds and many distinct brown (10YR 4/3) clay films on faces of peds; few pebbles; medium acid; clear smooth boundary.

Bt2—15 to 25 inches; olive brown (2.5Y 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate medium angular blocky; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few pebbles; slightly acid; clear smooth boundary.

BC—25 to 37 inches; light olive brown (2.5Y 5/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine and medium prismatic structure; firm; common distinct brown (10YR 4/3) clay films on faces of peds; few pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

C—37 to 60 inches; light olive brown (2.5Y 5/4) loam; few fine distinct yellowish brown (10YR 5/6) and common fine distinct light brownish gray (2.5Y 6/2) mottles; massive; firm; few pebbles; strong effervescence; moderately alkaline.

The solum ranges from 30 to 38 inches in thickness. The depth to free carbonates ranges from 20 to 38 inches. The surface layer ranges from 8 to 12 inches in thickness.

The Ap horizon has value of 2 to 4 and chroma of 1 to 3. It is strongly acid to neutral. The Bt horizon has hue of 10YR or 2.5Y. It is clay loam or loam. It is strongly acid to neutral. The clay content in the control section ranges from 25 to 35 percent. The BC and C horizons are mildly alkaline or moderately alkaline.

Dana Series

The Dana series consists of moderately well drained soils on till plains and moraines. These soils formed in loess and in the underlying silt loam or loam glacial till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slope ranges from 1 to 5 percent.

Dana soils are similar to Symerton and Varna soils and commonly are adjacent to Drummer and Raub soils. The poorly drained Drummer soils are in drainageways and depressions below Dana soils. The somewhat poorly drained Raub soils are in slightly lower positions than those of Dana soils. Symerton soils have more gravel and sand throughout than Dana soils. Varna soils have more clay in the control section than Dana soils.

Typical pedon of Dana silt loam, 1 to 5 percent slopes, 1,865 feet north and 1,275 feet east of the southwest corner of sec. 17, T. 24 N., R. 7 E.

Ap—0 to 9 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—9 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine and fine granular structure; friable; slightly acid; clear smooth boundary.

BA—14 to 19 inches; brown (10YR 4/3) silt loam; common fine faint yellowish brown (10YR 5/4) mottles; moderate very fine subangular blocky structure; friable; common faint dark brown (10YR 3/3) clay films and very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—19 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate very fine and fine angular blocky; firm; common faint brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt2—29 to 39 inches; olive brown (2.5Y 4/4) clay loam; few fine faint light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common faint dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt3—39 to 49 inches; olive brown (2.5Y 4/4) clay loam; few fine distinct olive (5Y 4/3) mottles; moderate medium prismatic structure; firm; common faint dark brown (10YR 3/3) clay films on faces of peds; neutral; gradual smooth boundary.

2BC—49 to 61 inches; olive brown (2.5Y 4/4) silt loam; moderate medium and coarse prismatic structure; firm; few faint dark brown (10YR 3/3) clay films on

faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.

2C—61 to 72 inches; olive brown (2.5YR 4/4) silt loam; common medium distinct dark brown (10YR 3/3) mottles; massive; firm; strong effervescence; mildly alkaline.

The solum ranges from 40 to more than 60 inches in thickness. The depth to free carbonates ranges from 40 to 60 inches. The mollic epipedon ranges from 10 to 18 inches in thickness.

The Ap and A horizons have value of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is strongly acid or medium acid. The 2Bt horizon is medium acid to neutral. The clay content in the control section ranges from 27 to 35 percent. The 2BC and 2C horizons are loam or silt loam. They are mildly alkaline or moderately alkaline.

Del Rey Series

The Del Rey series consists of somewhat poorly drained, slowly permeable soils on lake plains. These soils formed in silty and clayey lacustrine sediments. Slope ranges from 0 to 2 percent.

Del Rey soils are similar to Blount soils and commonly are adjacent to Drummer, Martinton, and Milford soils. Blount soils formed in glacial till. The poorly drained Drummer and Milford soils have a mollic epipedon and are in slightly lower positions than those of Del Rey soils. Martinton soils have a mollic epipedon and are in positions similar to those of Del Rey soils.

Typical pedon of Del Rey silt loam, 1,500 feet south and 1,540 feet west of the northeast corner of sec. 1, T. 23 N., R. 8 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; slightly acid; abrupt smooth boundary.

E—8 to 14 inches; light brownish gray (2.5Y 6/2) silt loam, light gray (2.5Y 7/2) dry; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium and thick platy structure; friable; slightly acid; clear smooth boundary.

Bt1—14 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine prominent light brownish gray (2.5Y 6/2) silt coatings; moderate fine prismatic structure parting to moderate fine and medium angular blocky; friable; common faint dark grayish brown (2.5Y 4/2) clay films; few fine and medium concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt2—18 to 27 inches; dark yellowish brown (10YR 4/4) silty clay; many fine prominent grayish brown (2.5Y 5/2) mottles; strong fine prismatic structure parting to moderate fine and medium angular blocky; firm; common distinct dark grayish brown (2.5Y 4/2) clay films and few prominent dark gray (10YR 4/1) organic coatings on faces of peds; few fine and medium concretions (iron and manganese oxides); very strongly acid; gradual smooth boundary.

Bt3—27 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; many fine prominent grayish brown (2.5Y 5/2) mottles; strong fine prismatic structure parting to fine and medium angular blocky; firm; many thin dark grayish brown (2.5Y 4/2) clay films and common prominent dark gray (10YR 4/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bt4—36 to 43 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine and medium angular blocky; firm; many faint dark grayish brown (2.5Y 4/2) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

BCg—43 to 52 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many faint dark grayish brown (2.5Y 4/2) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; gradual smooth boundary.

Cg—52 to 60 inches; grayish brown (2.5Y 5/2) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; common faint dark grayish brown (2.5Y 4/2) clay films; few very dark gray (10YR 3/1) organic coatings in root channels; mildly alkaline.

The solum ranges from 36 to 60 inches in thickness. The Ap horizon has value of 3 or 4 and chroma of 1 or 2. The E horizon has value of 4 to 6. Some pedons do not have an E horizon. The Bt horizon has value of 4 to 6 and chroma of 2 to 6. It is very strongly acid to moderately alkaline. The clay content in the control section ranges from 35 to 45 percent. The Cg horizon is silt loam, silty clay loam, or silty clay. It is mildly alkaline or moderately alkaline.

Drummer Series

The Drummer series consists of poorly drained,

moderately permeable soils on outwash plains and till plains. These soils formed in loess and in the underlying silty and loamy outwash. Slope ranges from 0 to 2 percent.

Drummer soils are similar to Pella and Selma soils and commonly are adjacent to Brenton, Milford, and Raub soils. The somewhat poorly drained Brenton and Raub soils have an argillic horizon and are in slightly higher positions than those of Drummer soils. Milford soils have more clay in the control section than Drummer soils. They are in similar positions or in slightly depressional areas below Drummer soils. Pella soils have free carbonates within a depth of 40 inches. Selma soils have more sand in the control section than Drummer soils.

Typical pedon of Drummer silty clay loam, 563 feet south and 165 feet east of the northwest corner of sec. 16, T. 23 N., R. 7 E.

Ap—0 to 8 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.

A—8 to 16 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine angular blocky structure; friable; neutral; clear smooth boundary.

Bg—16 to 21 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) and common fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium angular blocky structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Btg1—21 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Btg2—31 to 44 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; friable; few faint dark gray (5Y 4/1) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); few fine pebbles; neutral; clear smooth boundary.

2BCg—44 to 55 inches; grayish brown (2.5Y 5/2) silty clay loam with noticeable sand; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark gray (5Y 4/1) clay films in root channels; very dark gray (10YR 3/1) krotovinas at a depth of 53 inches; common fine and medium pebbles; neutral; gradual smooth boundary.

2Cg—55 to 60 inches; mottled gray (5Y 5/1), yellowish brown (10YR 5/6), and grayish brown (2.5Y 5/2), stratified silty clay loam and loam; massive; friable; common fine and medium pebbles; neutral.

The solum ranges from 45 to 60 inches in thickness The depth to free carbonates ranges from 40 to more than 60 inches. The mollic epipedon ranges from 10 to 24 incnes in thickness.

The Ap and A horizons have hue of 10YR or are neutral. They have value of 2 or 3 and chroma of 0 or 1. They are dominantly silty clay loam, but the range includes silt loam. The Bg and Btg horizons have hue of 2.5Y or 10YR, value of 3 to 5, and chroma of 1 or 2. They are silty clay loam or silt loam. They are medium acid to mildly alkaline. The clay content in the control section ranges from 27 to 34 percent. The 2BCg and 2Cg horizons have hue of 5Y, 2.5Y, or 10YR, value of 4 or 5, and chroma of 1 or 2. They are slightly acid to moderately alkaline. The 2BCg horizon is silty clay loam, silt loam, or loam. The 2Cg horizon is dominantly silty clay loam or clay loam but in some pedons has strata of sandy loam, loamy sand, or loam.

Elliott Series

The Elliott series consists of somewhat poorly drained soils on till plains and moraines. These soils formed in loess and in the underlying silty clay loam glacial till. They are moderately slowly permeable in the subsoil and slowly permeable in the underlying material. Slope ranges from 0 to 5 percent.

Elliott soils are similar to Martinton and Rutland soils and commonly are adjacent to Ashkum, Blount, Chatsworth, and Varna soils. The poorly drained Ashkum soils are in shallow depressions and drainageways below Elliott soils. Blount soils do not have a mollic epipedon and are in positions similar to those of Elliott soils. The moderately well drained Chatsworth and Varna soils are in slightly higher positions than those of Elliott soils. Chatsworth soils do not have a mollic epipedon. Martinton soils formed in lacustrine sediments. Rutland soils formed in loess and in the underlying silty clay glacial till.

Typical pedon of Elliott silt loam, 0 to 2 percent slopes, 690 feet north and 195 feet west of the

southeast corner of sec. 25, T. 25 N., R. 7 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine granular structure; friable; neutral; abrupt smooth boundary.

AB—8 to 13 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; friable; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

2Bt1—13 to 20 inches; dark yellowish brown (10YR 4/4) silty clay; common fine distinct yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine angular blocky structure; friable; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—20 to 24 inches; light olive brown (2.5Y 5/4) silty clay; common fine distinct yellowish brown (10YR 5/6) and olive gray (5Y 5/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

2Bt3—24 to 29 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and olive gray (5Y 5/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

2BC—29 to 38 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium prominent gray (5Y 6/1) and common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; slight effervescence; mildly alkaline; gradual smooth boundary.

2C—38 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium prominent gray (5Y 6/1) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; strong effervescence; moderately alkaline.

The solum ranges from 26 to 45 inches in thickness. The depth to free carbonates commonly is less than the thickness of the solum. The mollic epipedon ranges from 10 to 18 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silt loam, but the range includes silty clay loam. Some pedons have a Bt horizon. The 2Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4. It is silty clay or silty clay loam. It is medium acid to neutral in the upper part and neutral to mildly alkaline in the lower part. The clay content in the control section ranges from 35 to 45 percent. The 2C horizon is mildly alkaline or moderately alkaline.

The dark surface layer of Elliott silt loam, 2 to 5 percent slopes, eroded, is thinner than is definitive for the Elliott series. This difference, however, does not significantly alter the usefulness or behavior of the soil.

Harpster Series

The Harpster series consists of poorly drained, moderately permeable soils on outwash plains and lake plains. These soils formed in calcareous, silty sediments. Slopes range from 0 to 2 percent.

Harpster soils are similar to Pella soils and commonly are adjacent to Drummer and Pella soils. Drummer and Pella soils do not have a calcic surface horizon and are in positions similar to those of Harpster soils.

Typical pedon of Harpster silty clay loam, about 3 miles southwest of Gibson City; 855 feet south and 70 feet west of the northeast corner of sec. 20, T. 23 N., R. 7 E.

Apk—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; many snail shells; few pebbles; strong effervescence; 20 percent calcium carbonate equivalent; moderately alkaline; abrupt smooth boundary.

Ak—9 to 18 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine and medium granular structure; firm; many snail shells; few pebbles; strong effervescence; 18 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

Bg1—18 to 25 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine faint light olive brown (2.5Y 5/4) mottles; weak fine and medium angular blocky structure; firm; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few snail shells; few pebbles; slight effervescence; 7 percent calcium carbonate equivalent; moderately alkaline; gradual smooth boundary.

Bg2—25 to 31 inches; dark gray (5Y 4/1) silty clay

loam; few fine distinct olive (5Y 4/4) and dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few snail shells; few pebbles; slight effervescence; 5 percent calcium carbonate equivalent; mildly alkaline; gradual smooth boundary.

Bg3—31 to 36 inches; dark gray (5Y 4/1) silty clay loam; common medium distinct olive (5Y 4/4) and few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles; slight effervescence; 2 percent calcium carbonate equivalent; mildly alkaline; gradual smooth boundary.

Bg4—36 to 41 inches; mottled olive brown (2.5Y 4/4), olive yellow (2.5Y 6/6), and gray (5Y 5/1) silty clay loam; weak coarse angular blocky structure; firm; few pebbles; slight effervescence; 2 percent calcium carbonate equivalent; mildly alkaline; gradual smooth boundary.

Cg1—41 to 56 inches; mottled gray (5Y 5/1) and light olive brown (2.5Y 5/6) silt loam; few coarse prominent dark yellowish brown (10YR 4/4) mottles; massive; firm; few pebbles; strong effervescence; 16 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

Cg2—56 to 60 inches; gray (10YR 5/1) loam; about 5 percent gravel; massive; friable; strong effervescence; moderately alkaline.

The solum ranges from 41 to 46 inches in thickness. The mollic epipedon ranges from 15 to 21 inches in thickness. Reaction is mildly alkaline or moderately alkaline throughout the profile.

The Apk and Ak horizons have hue of 10YR or are neutral. They have chroma of 1 or 0. They are silty clay loam or silt loam. The Bg horizon has hue of 10YR, 5Y, or 2.5Y and value of 4 to 6. The clay content in the control section ranges from 27 to 35 percent. The Cg horizon is dominantly silt loam or loam but in some pedons has strata of sandy loam or clay loam.

Houghton Series

The Houghton series consists of very poorly drained, moderately slowly permeable to moderately rapidly permeable soils in depressions. These soils formed in highly decomposed, herbaceous, organic material. Slope ranges from 0 to 2 percent.

Houghton soils commonly are adjacent to the poorly drained Ashkum, Bryce, and Drummer soils. The adjacent soils formed entirely in mineral material and are in slightly higher positions than those of Houghton soils.

Typical pedon of Houghton muck, 150 feet south and 2,508 feet west of the northeast corner of sec. 26, T. 25 N., R. 7 E.

Oa1—0 to 12 inches; sapric material, black (N 2/0) broken face and rubbed; 2 percent fiber; moderate fine granular structure; slightly sticky; common fine roots; neutral; clear smooth boundary.

Oa2—12 to 20 inches; sapric material, very dark gray (10YR 3/1) broken face, very dark grayish brown (10YR 3/2) rubbed; less than 1 percent fiber; moderate fine angular blocky structure; slightly sticky; few fine roots; neutral; gradual smooth boundary.

Oa3—20 to 40 inches; sapric material, very dark grayish brown (10YR 3/2), broken face and rubbed; less than 1 percent fiber; weak medium angular blocky structure; slightly sticky; few fine roots; neutral; gradual smooth boundary.

Oa4—40 to 60 inches; sapric material, very dark gray (10YR 3/1) broken face, very dark grayish brown (10YR 3/2) rubbed; less than 1 percent fiber; massive; slightly sticky; no roots; mildly alkaline.

The organic material is more than 51 inches thick. The organic fibers are derived primarily from herbaceous plants, but in some layers the content of woody material is as much as 30 percent.

The Oa horizon has hue of 10YR or 7.5YR or is neutral. It has value of 2 or 3 and chroma of 0 to 3. It is medium acid to mildly alkaline.

Jasper Series

The Jasper series consists of well drained, moderately permeable soils on outwash plains and lake plains. These soils formed in loamy and silty outwash. Slope ranges from 1 to 5 percent.

Jasper soils are similar to Camden and Proctor soils and commonly are adjacent to Drummer, La Hogue, Pella, and Selma soils. The poorly drained Drummer, Pella, and Selma soils are in lower positions than those of Jasper soils. Also, Drummer and Pella soils have less sand in the control section. The somewhat poorly drained La Hogue soils are in nearly level areas below Jasper soils. Camden and Proctor soils formed in loess

and outwash. In addition, Camden soils do not have a mollic epipedon.

Typical pedon of Jasper loam, 1 to 5 percent slopes, 1,510 feet south and 112 feet west of the northeast corner of sec. 7, T. 27 N., R. 9 E.

Ap—0 to 7 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; weak fine and very fine granular structure; friable; medium acid; abrupt smooth boundary.

A—7 to 15 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine granular structure; friable; medium acid; clear smooth boundary.

AB—15 to 20 inches; very dark brown (10YR 2/2) loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure parting to moderate fine and medium granular; friable; medium acid; clear smooth boundary.

Bt1—20 to 29 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine and medium subangular blocky structure; friable; many faint dark brown (10YR 3/3) clay films and very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—29 to 40 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine and medium prismatic structure parting to weak fine and medium subangular blocky; very friable; common faint dark brown (10YR 3/3) clay films and common faint very dark brown (10YR 2/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BC—40 to 52 inches; dark yellowish brown (10YR 4/4), stratified loam and clay loam; many medium prominent light brownish gray (2.5Y 6/2), common fine distinct dark grayish brown (10YR 4/2), and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; 2-inch clay-enriched layer in lower part with about 10 percent gravel; slightly acid; clear smooth boundary.

C—52 to 60 inches; yellowish brown (10YR 5/4), stratified loam and silt loam; common fine prominent gray (5Y 6/1), few fine distinct light yellowish brown (2.5Y 6/4), and common fine prominent brown (7.5YR 4/4) mottles; massive; friable; neutral.

The solum ranges from 40 to 52 inches in thickness. The mollic epipedon ranges from 10 to 20 inches in thickness.

The Ap and A horizons have value of 2 or 3. They are silt loam or loam. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is loam, clay loam, sandy clay loam, silty clay loam, or sandy loam. It is medium acid to neutral. The clay content in the control section ranges from 18 to 32 percent. The content of sand coarser than very fine sand is more than 15 percent. The C horizon is stratified silt loam, loam, or sandy loam. It is neutral to moderately alkaline.

La Hogue Series

The La Hogue series consists of somewhat poorly drained, moderately permeable soils on outwash plains and lake plains. These soils formed in loamy glacial outwash. Slope ranges from 0 to 2 percent.

La Hogue soils are similar to Brenton and Raub soils and commonly are adjacent to Drummer, Jasper, Pella, and Selma soils. The poorly drained Drummer, Pella, and Selma soils are in slightly lower positions than those of La Hogue soils. In addition, Drummer and Pella soils have less sand in the control section. The well drained Jasper soils are in higher positions than those of La Hogue soils. Brenton and Raub soils have a mantle of loess and have less sand in the control section than La Hogue soils.

Typical pedon of La Hogue loam, 2,000 feet south and 545 feet west of the northeast corner of sec. 7, T. 27 N., R. 9 E.

Ap—0 to 7 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; slightly acid; abrupt smooth boundary.

A—7 to 13 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate very fine and fine granular structure; friable; slightly acid; clear smooth boundary.

AB—13 to 16 inches; very dark brown (10YR 2/2) loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure parting to moderate fine and medium granular; friable; slightly acid; clear smooth boundary.

Bt1—16 to 24 inches; brown (10YR 4/3) clay loam; common fine faint dark yellowish brown (10YR 4/4) and few fine distinct grayish brown (2.5Y 5/2) mottles; weak fine and medium prismatic structure parting to moderate fine and medium angular blocky; friable; many distinct dark grayish brown (10YR 4/2) clay films and common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—24 to 32 inches; olive brown (2.5Y 4/4) clay loam; common medium prominent yellowish brown (10YR

5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure parting to moderate fine and medium angular blocky; friable; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 2 percent concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt3—32 to 39 inches; olive brown (2.5Y 4/4) sandy loam; many medium distinct light brownish gray (2.5Y 6/2) and common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

BC—39 to 48 inches; light olive brown (2.5Y 5/4) sandy loam; many medium distinct light brownish gray (2.5Y 6/2) and many fine prominent yellowish brown (10YR 5/6) mottles; weak medium angular blocky structure; friable; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

C—48 to 60 inches; light olive brown (2.5Y 5/4) sandy loam; many medium distinct light brownish gray (2.5Y 6/2), many fine prominent yellowish brown (10YR 5/6), and common fine prominent gray (N 6/0) mottles; massive; friable; mildly alkaline.

The solum ranges from 40 to 48 inches in thickness. The depth to free carbonates is more than 48 inches. The mollic epipedon ranges from 10 to 16 inches in thickness.

The Ap and A horizons are loam or silt loam. The Bt horizon has hue of 10YR, 2.5Y, or 7.5YR, value of 3 to 5, and chroma of 2 to 5. It is silty clay loam, clay loam, sandy loam, and silt loam. It is medium acid to neutral. The clay content in the control section ranges from 18 to 34 percent. The C horizon is stratified silt loam, loam, sandy loam, or loamy sand.

Martinton Series

The Martinton series consists of somewhat poorly drained, moderately slowly permeable soils on lake plains. These soils formed in dominantly silty lacustrine sediments. Slope ranges from 0 to 2 percent.

Martinton soils are similar to Elliott and Rutland soils and commonly are adjacent to Drummer and Milford soils. Elliott and Rutland soils formed in glacial till. The poorly drained Drummer and Milford soils are in slightly lower positions than those of Martinton soils. In addition, Drummer soils have less clay in the control section.

Typical pedon of Martinton silt loam, 970 feet north and 820 feet west of the southeast corner of sec. 1, T. 23 N., R. 8 E.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

AB—10 to 15 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine granular structure; firm; neutral; clear smooth boundary.

Bt1—15 to 26 inches; brown (10YR 5/3) silty clay loam; few fine distinct yellowish brown (10YR 5/6) and dark grayish brown (2.5Y 4/2) mottles; moderate very fine angular blocky structure; firm; common faint dark grayish brown (10YR 4/2) clay films and common distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—26 to 39 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine angular blocky; firm; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; mildly alkaline; gradual smooth boundary.

BCg—39 to 51 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and few medium distinct gray (5Y 5/1) mottles; weak fine and medium prismatic structure; firm; slight effervescence; mildly alkaline; clear smooth boundary.

Cg—51 to 60 inches; mottled gray (5Y 5/1) and light olive brown (2.5Y 5/4), stratified silty clay loam and silt loam; massive; firm; strong effervescence; moderately alkaline.

The solum ranges from 48 to 52 inches in thickness. The mollic epipedon ranges from 10 to 18 inches in thickness.

The Ap horizon has hue of 10YR or is neutral. It has value of 2 or 3 and chroma of 2 or less. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. It is dominantly silty clay or silty clay loam. In some pedons, however, it has thin subhorizons of silt loam or loam. It is medium acid to mildly alkaline. The clay content in the control section ranges from 35 to 45 percent. The Cg horizon typically is stratified with thin

layers of silt loam, sandy loam, silty clay loam, or loam. It is mildly alkaline or moderately alkaline.

Milford Series

The Milford series consists of poorly drained, moderately slowly permeable soils on lake plains. These soils formed in dominantly silty lacustrine sediments. Slope ranges from 0 to 2 percent.

Milford soils are similar to Ashkum and Bryce soils and commonly are adjacent to Bryce, Drummer, Martinton, and Pella soils. Ashkum soils formed in glacial till. Bryce, Drummer, and Pella soils are in positions similar to those of Milford soils. Bryce soils have more clay in the control section than Milford soils, and Drummer and Pella soils have less clay in the control section. In addition, Pella soils have free carbonates within a depth of 40 inches. The somewhat poorly drained Martinton soils are in slightly higher positions than those of Milford soils.

Typical pedon of Milford silty clay loam, 2,577 feet north and 190 feet east of the southwest corner of sec. 24, T. 26 N., R. 9 E.

Ap—0 to 9 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.

A—9 to 16 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; neutral; clear smooth boundary.

Btg1—16 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate fine angular blocky; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds; neutral; clear smooth boundary.

Btg2—23 to 36 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; many distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Btg3—36 to 52 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate to weak medium prismatic structure; firm; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; dark grayish brown (2.5Y 4/2) krotovinas between depths of 40 and 47 inches; neutral; gradual smooth boundary.

Cg—52 to 60 inches; grayish brown (2.5Y 5/2), stratified silt loam, loam, silt, and silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; slight effervescence; mildly alkaline.

The solum ranges from 45 to 52 inches in thickness. The depth to free carbonates is more than 52 inches. The mollic epipedon ranges from 12 to 21 inches in thickness.

The Btg horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 or 2. It is silty clay or silty clay loam. It is mildly alkaline to medium acid. The clay content in the control section ranges from 35 to 42 percent. The Cg horizon is stratified loam, silty clay loam, silt, or silt loam.

Morley Series

The Morley series consists of moderately well drained soils on till plains and moraines. These soils formed in loess and in the underlying silty clay loam glacial till. They are moderately slowly permeable in the upper part of the solum and slowly permeable in the lower part and in the substratum. Slope ranges from 1 to 5 percent.

Morley soils commonly are adjacent to Ashkum, Blount, and Sawmill soils. The poorly drained Ashkum soils have a mollic epipedon, do not have an argillic horizon, and are in lower positions than those of Morley soils. The somewhat poorly drained Blount soils are in slightly lower positions than those of Morley soils. The poorly drained Sawmill soils are on flood plains below Morley soils.

Typical pedon of Morley silt loam, 1 to 5 percent slopes, 1,145 feet north and 610 feet east of the southwest corner of sec. 30, T. 23 N., R. 10 E.

Ap1—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

Ap2—5 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; friable; neutral; abrupt smooth boundary.

BA—8 to 11 inches; brown (10YR 4/3) silt loam; moderate very fine angular blocky structure; friable; many faint very dark grayish brown (10YR 3/2)

organic coatings on faces of peds; medium acid; clear smooth boundary.

2Bt1—11 to 16 inches; brown (10YR 4/3) silty clay loam; moderate fine prismatic structure parting to moderate very fine and fine angular blocky; firm; many faint dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt2—16 to 24 inches; olive brown (2.5Y 4/4) silty clay; few fine distinct olive (5Y 5/3) mottles; strong fine and medium prismatic structure parting to strong fine and medium angular blocky; firm; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt3—24 to 29 inches; olive brown (2.5Y 4/4) silty clay loam; few fine distinct light olive brown (2.5Y 5/6) and few fine prominent light olive gray (5Y 6/2) mottles; moderate medium prismatic structure; firm; few faint dark brown (10YR 4/3) clay films on faces of peds; mildly alkaline; clear smooth boundary.

2BC—29 to 40 inches; olive brown (2.5Y 4/4) silty clay loam; few medium faint light olive brown (2.5Y 5/6) and few medium prominent light olive gray (5Y 6/2) mottles; weak medium prismatic structure; firm; few faint dark brown (10YR 4/3) clay films on faces of peds; slight effervescence; mildly alkaline; gradual smooth boundary.

2C—40 to 60 inches; mottled light olive brown (2.5Y 5/6), light olive gray (5Y 6/2), and olive brown (2.5Y 4/4) silty clay loam; massive; firm; common fine white accumulations (calcium carbonates); strong effervescence; moderately alkaline.

The solum ranges from 31 to 46 inches in thickness. The depth to free carbonates ranges from 29 to 42 inches. The clay content in the control section ranges from 35 to 50 percent.

The 2Bt1 horizon has value of 4 or 5 and chroma of 3 or 4. It is strongly acid to slightly acid. The 2Bt2 and 2Bt3 horizons have value of 4 or 5. They are medium acid to mildly alkaline. The 2C horizon is slightly acid to moderately alkaline.

Onarga Series

The Onarga series consists of well drained soils on outwash ridges. These soils formed in loamy and sandy eolian deposits and glacial outwash. They are moderately permeable in the subsoil and rapidly permeable in the substratum. Slope ranges from 1 to 5 percent.

Onarga soils commonly are adjacent to Pella, Ridgeville, and Selma soils. The poorly drained Pella and Selma soils have more clay in the control section than Onarga soils and are in lower positions. The somewhat poorly drained Ridgeville soils also are in lower positions.

Typical pedon of Onarga fine sandy loam, 1 to 5 percent slopes, 858 feet south and 2,094 feet west of the northeast corner of sec. 11, T. 27 N., R. 9 E.

Ap—0 to 10 inches; very dark brown (10YR 2/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate fine subangular blocky structure; friable; common faint very dark grayish brown (10YR 3/2) organic coatings and common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—16 to 22 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—22 to 29 inches; yellowish brown (10YR 5/6) fine sandy loam; moderate medium subangular blocky structure; very friable; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

BC—29 to 37 inches; yellowish brown (10YR 5/6) loamy fine sand; weak medium subangular blocky structure; very friable; strongly acid; clear smooth boundary.

C—37 to 60 inches; yellowish brown (10YR 5/6) loamy fine sand; few medium distinct strong brown (7.5YR 5/6) mottles; single grain; loose; medium acid.

The solum ranges from 37 to 50 inches in thickness. The mollic epipedon ranges from 10 to 15 inches in thickness. The clay content in the control section ranges from 15 to 18 percent. The total content of sand ranges from about 45 to 70 percent.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 3 to 5 and chroma of 3 to 6. It is fine sandy loam, loamy fine sand, loam, or sandy loam. It is very strongly acid to neutral. The C horizon is loamy fine sand, fine sand, or fine sandy loam. It is strongly acid to neutral.

Pella Series

The Pella series consists of poorly drained,

moderately permeable soils on lake plains. These soils formed in silty lacustrine sediments and in the underlying silty and loamy glacial outwash. Slope ranges from 0 to 2 percent.

Pella soils are similar to Drummer and Selma soils and commonly are adjacent to La Hogue, Milford, and Selma soils. Drummer, Milford, and Selma soils do not have free carbonates within a depth of 40 inches and are in positions similar to those of Pella soils. Milford soils have more clay throughout than Pella soils, and Selma soils have more sand in the control section. The somewhat poorly drained La Hogue soils also have more sand in the control section and do not have free carbonates within a depth of 40 inches. They are in slightly higher positions than those of Pella soils.

Typical pedon of Pella silty clay loam, 190 feet north and 2,225 feet west of the southeast corner of sec. 14, T. 27 N., R. 9 E.

Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate very fine and fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—7 to 12 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate fine and very fine granular structure; friable; neutral; clear smooth boundary.

Bg1—12 to 20 inches; grayish brown (2.5Y 5/2) silty clay loam; weak fine and medium prismatic structure parting to moderate fine and very fine angular blocky; friable; neutral; clear smooth boundary.

Bg2—20 to 27 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; weak fine and medium prismatic structure parting to moderate fine and medium angular blocky; friable; slight effervescence; mildly alkaline; clear smooth boundary.

Bg3—27 to 33 inches; gray (5Y 6/1) silty clay loam; many medium prominent light olive brown (2.5Y 5/4) and common fine prominent dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to moderate medium angular blocky; friable; very dark gray (10YR 3/1) krotovinas; slight effervescence; mildly alkaline; gradual wavy boundary.

2BCg—33 to 42 inches; gray (5Y 6/1) silt loam that has a high content of sand; moderate medium prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; slight effervescence; moderately alkaline; gradual wavy boundary.

2Cg—42 to 60 inches; gray (5Y 6/1), stratified silt loam, loam, and sandy loam; many medium prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; massive; friable; strong effervescence; moderately alkaline.

The solum ranges from 30 to 50 inches in thickness. The depth to free carbonates is 20 to 40 inches. The mollic epipedon ranges from 10 to 22 inches in thickness. The clay content in the control section ranges from 27 to 35 percent.

The Ap and A horizons have hue of 10YR or are neutral. They have value of 2 or 3 and chroma of 2 or less. They are silty clay loam or silt loam. The Bg horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2. It is clay loam or silty clay loam. It is neutral or mildly alkaline. The 2BCg horizon is silt loam, loam, or sandy loam and in some pedons is stratified. The 2Cg horizon is stratified silty clay loam, silt loam, loam, or sandy loam.

Peotone Series

The Peotone series consists of very poorly drained, moderately slowly permeable soils on till plains, outwash plains, and lake plains. These soils formed in silty and clayey local wash. Slope ranges from 0 to 2 percent.

Peotone soils are similar to Rantoul soils and commonly are adjacent to Ashkum, Drummer, Milford, and Pella soils. The poorly drained Ashkum, Drummer, Milford, and Pella soils are not cumulic and are in slightly higher positions than those of Peotone soils. Also, Drummer and Pella soils have less clay in the control section. Rantoul soils have more clay in the control section than Peotone soils.

Typical pedon of Peotone silty clay loam, 315 feet south and 2,233 feet east of the northwest corner of sec. 21, T. 29 N., R. 9 E.

Ap—0 to 7 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; neutral; clear smooth boundary.

A—7 to 13 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; neutral; clear smooth boundary.

Bg1—13 to 27 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate medium angular blocky structure; friable; neutral; clear smooth boundary.

Bg2—27 to 41 inches; dark gray (10YR 4/1) silty clay;

common fine faint dark grayish brown (10YR 4/2) and few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine prismatic structure; firm; mildly alkaline; clear smooth boundary.

Bg3—41 to 50 inches; dark gray (10YR 4/1) silty clay; common medium faint dark grayish brown (10YR 4/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; mildly alkaline; clear smooth boundary.

Cg—50 to 60 inches; dark gray (10YR 4/1) silty clay loam; few fine faint dark grayish brown (10YR 4/2) and few fine prominent yellowish brown (10YR 5/6) mottles; massive; firm; slight effervescence; mildly alkaline.

The solum ranges from 39 to 60 inches in thickness. The mollic epipedon ranges from 24 to 36 inches in thickness. The clay content in the control section ranges from 35 to 45 percent.

The Ap and A horizons have hue of 10YR or are neutral. They have chroma of 1 or less. The Bg horizon has hue of 10YR or 5Y or is neutral. It has value of 2 to 5 and chroma of 2 or less. It is slightly acid to mildly alkaline. The Cg horizon dominantly is silty clay loam but in some pedons is silt loam. It is mildly alkaline or moderately alkaline. Some pedons do not have free carbonates in the lower part.

Proctor Series

The Proctor series consists of well drained soils on outwash plains. These soils formed in loess and in the underlying dominantly loamy glacial outwash. Permeability is moderate in the solum and moderately rapid in the substratum. Slope ranges from 1 to 5 percent.

Proctor soils are similar to Camden and Jasper soils and commonly are adjacent to Brenton and Drummer soils. The somewhat poorly drained Brenton soils are in slightly lower positions than those of Proctor soils. Camden soils do not have a mollic epipedon. The poorly drained Drummer soils do not have an argillic horizon and are in depressions and drainageways below Proctor soils. Jasper soils have more sand in the control section than Proctor soils.

Typical pedon of Proctor silt loam, 1 to 5 percent slopes, 207 feet north and 1,620 feet east of the southwest corner of sec. 7, T. 24 N., R. 7 E.

Ap—0 to 10 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; slightly acid; clear smooth boundary.

AB—10 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; common faint very dark brown (10YR 2/2) organic coatings; medium acid; clear smooth boundary.

Bt1—15 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine angular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films and common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; gradual smooth boundary.

Bt2—25 to 33 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate fine angular blocky; friable; common faint dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

2BC—33 to 41 inches; dark yellowish brown (10YR 4/4) loam; weak fine and medium prismatic structure; friable; slightly acid; clear smooth boundary.

2C—41 to 60 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; friable; neutral.

The solum ranges from 40 to 56 inches in thickness. The depth to free carbonates is more than 40 inches. The mollic epipedon ranges from 11 to 18 inches in thickness. The clay content in the control section ranges from 27 to 34 percent.

The Bt horizon has value of 3 to 5 and chroma of 3 or 4. The 2BC horizon has value of 3 to 5 and chroma of 4 to 6. It is loam and clay loam. It is medium acid to mildly alkaline. The 2C horizon is stratified sandy loam, loam, loamy sand, or silt loam. It is slightly acid to mildly alkaline.

Rantoul Series

The Rantoul series consists of very poorly drained, very slowly permeable soils on till plains and lake plains. These soils formed in clayey local wash. Slope ranges from 0 to 2 percent.

Rantoul soils are similar to Peotone soils and commonly are adjacent to Bryce and Rowe soils. The poorly drained Bryce and Rowe soils are not cumulic and are in slightly higher positions than those of Rantoul soils. Peotone soils have less clay in the control section than Rantoul soils.

Typical pedon of Rantoul silty clay, 1,910 feet south and 195 feet east of the northwest corner of sec. 20, T. 23 N., R. 14 W.

Ap—0 to 8 inches: black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

A—8 to 13 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; weak very fine granular structure; firm; neutral; abrupt smooth boundary.

BA—13 to 21 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; moderate very fine angular blocky structure; firm; neutral; clear smooth boundary.

Bg1—21 to 31 inches; black (N 2/0) silty clay, very dark gray (N 3/0) dry; few fine prominent olive brown (2.5Y 4/4) mottles; weak fine prismatic structure parting to moderate fine and very fine angular blocky; firm; neutral; clear smooth boundary.

Bg2—31 to 38 inches; black (5Y 2/1) silty clay, dark gray (5Y 4/1) dry; few fine distinct olive gray (5Y 5/2) and few fine prominent olive brown (2.5Y 4/4) mottles; moderate fine and medium prismatic structure parting to moderate fine angular blocky; firm; neutral; clear wavy boundary.

BCg—38 to 48 inches; mottled olive yellow (5Y 6/6), yellowish brown (10YR 5/6), and gray (5Y 5/1) silty clay; weak coarse prismatic structure; firm; thin layer of silt loam; mildly alkaline; gradual smooth boundary.

Cg—48 to 60 inches; mottled gray (5Y 5/1), yellowish brown (10YR 5/6), and light olive gray (5Y 6/2) silty clay; massive; firm; black (5Y 2/1) krotovinas; slight effervescence; mildly alkaline.

The solum ranges from 42 to 60 inches in thickness. The depth to free carbonates ranges from 42 to 60 inches. The mollic epipedon ranges from 24 to 38 inches in thickness.

The Ap and A horizons have hue of 10YR or are neutral. They have value of 2 or 3 and chroma of 1 or 0. They are silty clay or silty clay loam. The Bg horizon has hue of 5Y or 2.5Y or is neutral. It has value of 2 to 5 and chroma of 2 or less. It is silty clay or clay. It is slightly acid to moderately alkaline. The C horizon is mildly alkaline or moderately alkaline.

Raub Series

The Raub series consists of somewhat poorly drained, moderately slowly permeable soils on till plains and moraines. These soils formed in loess and the underlying loam or silt loam glacial till. Slope ranges from 0 to 3 percent.

Raub soils are similar to Brenton and La Hogue soils and commonly are adjacent to Dana and Drummer soils. The moderately well drained Dana soils are in slightly higher positions than those of Raub soils. The poorly drained Drummer soils are in depressions and drainageways below Raub soils. Brenton and La Hogue soils have more sand in the lower part than Raub soils.

Typical pedon of Raub silt loam, 0 to 3 percent slopes, 170 feet west and 964 feet south of the northeast corner of sec. 18, T. 24 N., R. 7 E.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

A—10 to 16 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common distinct black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—16 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; common distinct very dark brown (10YR 2/2) organic coatings and common distinct brown (10YR 4/3) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Bt2—23 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; common fine prominent light brownish gray (2.5Y 6/2) and common fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few distinct very dark brown (10YR 2/2) organic coatings and common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt3—31 to 36 inches; light olive brown (2.5Y 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; dark grayish brown (2.5Y 4/2) clay films on faces of peds; common fine irregular dark accumulations (iron and manganese oxides); neutral; abrupt smooth boundary.

2BC—36 to 45 inches; light olive brown (2.5Y 5/4) silt loam; common medium distinct yellowish brown (10YR 5/6) and common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure; firm; common pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

2C—45 to 60 inches; light olive brown (2.5Y 5/4) loam;

common medium distinct yellowish brown (10YR 5/6) and common medium distinct light brownish gray (10YR 6/2) mottles; massive; firm; common pebbles; violent effervescence; moderately alkaline.

The solum ranges from 45 to more than 60 inches in thickness. The depth to free carbonates ranges from 36 to 54 inches. The mollic epipedon ranges from 10 to 17 inches in thickness.

The 2BC horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 4. It is neutral or mildly alkaline.

Ridgeville Series

The Ridgeville series consists of somewhat poorly drained soils on outwash ridges. These soils formed in loamy and sandy glacial outwash. They are moderately permeable in the upper part and moderately rapidly permeable in the lower part. Slope ranges from 0 to 2 percent.

Ridgeville soils commonly are adjacent to Onarga, Pella, and Selma soils. The well drained Onarga soils are in higher positions than those of Ridgeville soils. The poorly drained Pella and Selma soils have more clay in the control section than Ridgeville soils and are in slightly lower positions.

Typical pedon of Ridgeville fine sandy loam, 1,113 feet north and 995 feet east of the southwest corner of sec. 1, T. 27 N., R. 9 E.

Ap—0 to 12 inches; very dark gray (10YR 3/1) fine sandy loam, dark gray (10YR 4/1) dry; weak fine granular structure; very friable; medium acid; abrupt smooth boundary.

Bt—12 to 25 inches; dark brown (10YR 4/3) loam; few fine distinct yellowish brown (10YR 5/6) and few fine faint very dark grayish brown (10YR 3/2) mottles; weak medium and fine subangular blocky structure; friable; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

BC—25 to 48 inches; yellowish brown (10YR 5/4), stratified sandy loam and loamy sand; common medium distinct grayish brown (10YR 5/2), few medium faint pale brown (10YR 6/3), and common fine faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; medium acid; gradual smooth boundary.

C—48 to 60 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6), stratified sandy loam, loamy sand, and sand; single grain; very friable; slightly acid.

The solum ranges from 39 to 48 inches in thickness. It is medium acid or slightly acid throughout. The mollic epipedon is 10 to 14 inches thick. The clay content in the control section ranges from 14 to 18 percent. The total content of sand ranges from 45 to 70 percent.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has chroma of 2 to 6. The BC and C horizons are stratified sandy loam, loamy sand, and sand.

Rowe Series

The Rowe series consists of poorly drained, very slowly permeable soils on till plains and moraines. These soils formed in silty and clayey local wash and in the underlying silty clay or clay glacial till. Slope ranges from 0 to 2 percent.

Rowe soils commonly are adjacent to Clarence and Rantoul soils. The somewhat poorly drained Clarence soils are in slightly higher positions than those of Rowe soils. The very poorly drained Rantoul soils are cumulic, do not have an argillic horizon, and are in depressions below Rowe soils.

Typical pedon of Rowe silty clay loam, 2,354 feet south and 186 feet west of the northeast corner of sec. 1, T. 24 N., R. 9 E.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak very fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—7 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine and very fine angular blocky structure; friable; neutral; clear smooth boundary.

AB—14 to 20 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; few fine prominent yellowish brown (10YR 5/6) and few fine prominent very dark grayish brown (2.5Y 3/2) mottles; moderate fine and very fine angular blocky structure; friable; neutral; clear smooth boundary.

2Btg1—20 to 30 inches; olive gray (5Y 5/2) silty clay; many fine prominent yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate fine angular blocky; firm; many faint dark grayish brown (2.5Y 4/2) clay films and common faint very dark gray (5Y 3/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

2Btg2—30 to 41 inches; olive gray (5Y 5/2) silty clay; many medium prominent yellowish brown (10YR

5/6) mottles; moderate fine prismatic structure; firm; common faint olive gray (5Y 4/2) clay films on faces of peds; mildly alkaline; gradual smooth boundary.

2BCg—41 to 52 inches; olive gray (5Y 5/2) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; firm; few distinct dark gray (5Y 4/1) clay films on faces of peds; slight effervescence; mildly alkaline; gradual smooth boundary.

2Cg—52 to 60 inches; olive gray (5Y 5/2) silty clay; many medium prominent yellowish brown (10YR 5/6) mottles; massive; very firm; slight effervescence; moderately alkaline.

The solum ranges from 32 to 52 inches in thickness. The depth to free carbonates is 30 to 55 inches. The mollic epipedon ranges from 10 to 24 inches in thickness. The clay content in the control section ranges from 48 to 60 percent.

The Ap and A horizons have value of 2 or 3. The 2Btg horizon has hue of 2.5Y or 5Y and chroma of 2 to 4. It is silty clay or clay. It is slightly acid to moderately alkaline. The 2Cg horizon is silty clay or clay.

Rutland Series

The Rutland series consists of somewhat poorly drained soils on till plains and moraines. These soils formed in loess or silty material and in the underlying silty clay or clay glacial till. They are moderately slowly permeable in the upper part and slowly permeable in the lower part. Slope ranges from 1 to 5 percent.

Rutland soils are similar to Elliott and Martinton soils and commonly are adjacent to Bryce, Clarence, Rowe, and Swygert soils. The poorly drained Bryce and Rowe soils have more clay in the solum than Rutland soils and are in slightly lower positions. Clarence, Elliott, and Swygert soils are in positions similar to those of Rutland soils. Clarence and Swygert soils have more clay in the control section than Rutland soils. Elliott soils formed in loess and in the underlying silty clay loam glacial till. Martinton soils formed in lacustrine sediments.

Typical pedon of Rutland silt loam, 1 to 5 percent slopes, 600 feet south and 1,750 feet east of the northwest corner of sec. 35, T. 26 N., R. 9 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; neutral; abrupt smooth boundary.

A—9 to 12 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine and fine granular structure; friable; slightly acid; clear smooth boundary.

BA—12 to 16 inches; brown (10YR 4/3) silt loam; weak medium and fine angular blocky structure parting to moderate fine granular; friable; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—16 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium and fine angular blocky structure; firm; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—23 to 29 inches; brown (10YR 4/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium and fine angular blocky; firm; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine accumulations (iron and manganese oxides); mildly alkaline; clear smooth boundary.

Bt3—29 to 34 inches; brown (10YR 4/3) silty clay loam; many fine distinct dark yellowish brown (10YR 4/4) and common fine prominent grayish brown (2.5Y 5/2) mottles; weak medium prismatic structure parting to moderate medium and fine angular blocky; friable; common faint grayish brown (10YR 5/2) clay films on faces of peds; few fine accumulations (iron and manganese oxides); mildly alkaline; clear smooth boundary.

Bt4—34 to 41 inches; brown (10YR 4/3) silty clay loam; many fine distinct dark yellowish brown (10YR 4/4) and common fine prominent grayish brown (2.5Y 5/2) mottles; moderate medium and fine angular blocky structure; friable; few faint grayish brown (10YR 5/2) clay films on faces of peds; slight effervescence; mildly alkaline; abrupt smooth boundary.

2BC—41 to 47 inches; light olive brown (2.5Y 5/4) silty clay; many medium distinct light brownish gray (2.5Y 6/2) and common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure; very firm; strong effervescence; moderately alkaline; gradual wavy boundary.

2Cg—47 to 60 inches; grayish brown (2.5Y 5/2) silty clay; many medium faint light brownish gray (2.5Y 6/2) and common fine prominent dark yellowish brown (10YR 4/4) mottles; massive; very firm; strong effervescence; moderately alkaline.

The solum ranges from 42 to 60 inches in thickness. The loess ranges from 35 to 55 inches in thickness. The mollic epipedon ranges from 10 to 20 inches in

thickness. The clay content in the control section ranges from 35 to 45 percent.

The Ap and A horizons have value of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4. It is strongly acid to moderately alkaline. The 2BC and 2C horizons are neutral to moderately alkaline.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slope ranges from 0 to 2 percent.

Sawmill soils are similar to Zook soils and commonly are adjacent to Blount, Camden, and Morley soils. Blount, Camden, and Morley soils do not have a mollic epipedon, are not subject to flooding, and are on uplands above Sawmill soils. Zook soils have more clay in the control section than Sawmill soils.

Typical pedon of Sawmill silty clay loam, 426 feet south and 186 feet west of the northeast corner of sec. 32, T. 23 N., R. 10 E.

Ap—0 to 8 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; neutral; clear smooth boundary.

A—8 to 14 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; firm; slightly acid; clear smooth boundary.

BA—14 to 29 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine prismatic structure parting to weak fine angular blocky; friable; neutral; gradual smooth boundary.

Bg1—29 to 41 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bg2—41 to 48 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Cg—48 to 60 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral.

The solum ranges from 48 to 60 inches in thickness. The depth to free carbonates is more than 40 inches. The mollic epipedon ranges from 29 to 36 inches in thickness. The clay content in the control section ranges from 5 to 40 percent.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral. They have chroma of 0 or 1. They are silt loam or silty clay loam. The Bg horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2. It is slightly acid to mildly alkaline. The Cg horizon is dominantly silty clay loam, but in some pedons it has strata of silt loam and loam. It is slightly acid to moderately alkaline.

Selma Series

The Selma series consists of poorly drained soils on outwash ridges. These soils formed in loamy glacial outwash. They are moderately permeable in the subsoil and moderately rapidly permeable in the substratum. Slope ranges from 0 to 2 percent.

Selma soils are similar to Drummer and Pella soils and commonly are adjacent to La Hogue, Pella, and Ridgeville soils. The somewhat poorly drained La Hogue and Ridgeville soils are in slightly higher positions than those of Selma soils. Also, Ridgeville soils have less clay in the control section. Drummer and Pella soils have less sand in the control section than Selma soils. They are in positions similar to those of Selma soils. Pella soils have free carbonates within a depth of 40 inches.

Typical pedon of Selma loam, 870 feet north and 175 feet west of the southeast corner of sec. 36, T. 28 N., R. 9 E.

Ap—0 to 8 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—8 to 15 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; neutral; clear smooth boundary.

AB—15 to 21 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; neutral; clear smooth boundary.

Bg1—21 to 30 inches; grayish brown (2.5Y 5/2) clay loam; few fine prominent light olive brown (2.5Y 5/6) mottles; moderate fine and medium angular blocky structure; firm; mildly alkaline; clear smooth boundary.

Bg2—30 to 37 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent light olive brown

(2.5Y 5/6) mottles; moderate medium angular blocky structure; firm; mildly alkaline; clear smooth boundary.

BCg—37 to 46 inches; mottled gray (5Y 6/1), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/6) loam; weak medium prismatic structure; firm; mildly alkaline; gradual smooth boundary.

Cg—46 to 60 inches; mottled gray (5Y 6/1), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/6), stratified loam and sandy loam; massive; friable; slight effervescence; moderately alkaline.

The solum ranges from 40 to 55 inches in thickness. The depth to free carbonates ranges from 38 to 60 inches. The mollic epipedon ranges from 10 to 20 inches in thickness. The clay content in the control section ranges from 20 to 30 percent.

The Ap and A horizons have hue of 10YR or are neutral. They have chroma of 0 to 2. They are loam, silt loam, or clay loam. The Bg horizon has value of 4 to 6. It is clay loam, silt loam, sandy loam, or loam. It is slightly acid to moderately alkaline. The Cg horizon is dominantly stratified sandy loam, loam, or silt loam but in some pedons has gravelly strata. It is neutral to moderately alkaline.

Swygert Series

The Swygert series consists of somewhat poorly drained soils on till plains and moraines. These soils formed in loess or lacustrine sediments and in the underlying silty clay glacial till. They are slowly permeable in the upper part and very slowly permeable in the lower part. Slope ranges from 0 to 5 percent.

Swygert soils are similar to Clarence soils and commonly are adjacent to Bryce and Rutland soils. The poorly drained Bryce soils do not have an argillic horizon and are in slightly lower positions than those of Swygert soils. Rutland soils have less clay in the control section than Swygert soils. They are in positions similar to those of Swygert soils. Clarence soils have more clay throughout than Swygert soils and have a thinner solum.

Typical pedon of Swygert silty clay loam, 0 to 2 percent slopes, 1,014 feet north and 396 feet east of the southwest corner of sec. 3, T. 23 N., R. 10 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and very fine granular structure; friable; neutral; abrupt smooth boundary.

A—9 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine and medium granular structure; friable; neutral; clear smooth boundary.

AB—13 to 18 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak fine angular blocky structure parting to moderate fine and medium granular; friable; neutral; clear smooth boundary.

2Bt1—18 to 28 inches; light olive brown (2.5Y 5/4) silty clay; common fine prominent yellowish brown (10YR 5/6) and few fine distinct light brownish gray (2.5Y 6/2) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; firm; common distinct very dark grayish brown (10YR 3/2) organic coatings and many prominent dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt2—28 to 36 inches; light olive brown (2.5Y 5/4) silty clay; common fine prominent yellowish brown (10YR 5/6) and few fine distinct light brownish gray (2.5Y 6/2) mottles; weak medium prismatic structure parting to moderate medium angular blocky; firm; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; mildly alkaline; clear smooth boundary.

2BC—36 to 48 inches; light olive brown (2.5Y 5/4) silty clay; common medium prominent yellowish brown (10YR 5/6) and common fine prominent gray (5Y 6/1) mottles; weak medium prismatic structure; few faint dark gray (10YR 4/1) clay films on faces of peds; firm; slight effervescence; moderately alkaline; gradual wavy boundary.

2C—48 to 60 inches; light olive brown (2.5Y 5/4) silty clay; many medium prominent yellowish brown (10YR 5/6) and common fine prominent gray (5Y 6/1) mottles; massive; firm; strong effervescence; moderately alkaline.

The solum ranges from 36 to 55 inches in thickness. The depth to glacial till is less than 43 inches. The depth to free carbonates ranges from 20 to 43 inches. The mollic epipedon ranges from 10 to 18 inches in thickness. The clay content in the control section ranges from 45 to 50 percent.

The Ap and A horizons have chroma of 1 or 2. They are dominantly silty clay loam, but the range includes silt loam. The 2Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 2 to 6. It is medium acid to moderately alkaline. The 2C horizon is mildly alkaline or moderately alkaline.

The dark surface layer of Swygert silty clay loam, 2

to 5 percent slopes, eroded, is thinner than is definitive for the Swygert series. This difference, however, does not alter the usefulness or behavior of the soil.

Symerton Series

The Symerton series consists of moderately well drained soils on till plains and moraines. These soils formed in loess, loamy outwash, and the underlying silty clay loam glacial till. They are moderately permeable in the subsoil and moderately slowly permeable in the substratum. Slope ranges from 1 to 5 percent.

Symerton soils are similar to Dana and Varna soils and commonly are adjacent to Ashkum and Elliott soils. Ashkum, Elliott, and Varna soils have less gravel and sand and more clay in the control section than Symerton soils. The poorly drained Ashkum soils are in depressions and drainageways below Symerton soils. The somewhat poorly drained Elliott soils are in slightly lower positions than those of Symerton soils. Dana soils have less gravel and sand in the control section than Symerton soils.

Typical pedon of Symerton silt loam, 1 to 5 percent slopes, 1,796 feet north and 1,636 feet east of the southwest corner of sec. 7, T. 23 N., R. 9 E.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 4/3) dry; weak very fine granular structure; friable; neutral; abrupt smooth boundary.

2Bt1—11 to 19 inches; brown (10YR 4/3) gravelly clay loam; moderate very fine angular blocky structure; friable; many faint very dark grayish brown (10YR 3/2) clay films on faces of peds; about 20 percent gravel; neutral; clear smooth boundary.

2Bt2—19 to 26 inches; dark yellowish brown (10YR 4/4) gravelly clay loam; few fine prominent dark grayish brown (2.5Y 4/2) and few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate fine angular blocky structure; friable; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; about 20 percent gravel; neutral; clear smooth boundary.

2Bt3—26 to 33 inches; brown (10YR 4/3) gravelly clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure; friable, common faint very dark grayish brown (10YR 3/2) clay films on faces of peds; about 15 percent gravel; neutral; abrupt smooth boundary.

3BC—33 to 37 inches; olive (5Y 4/3) silty clay loam; few fine prominent gray (N 6/0) and common fine prominent light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure; firm; slight effervescence; mildly alkaline; clear smooth boundary.

3C—37 to 60 inches; olive (5Y 5/3) silty clay loam; common fine prominent gray (N 6/0) mottles; massive; very firm; strong brown (7.5YR 5/8) iron accumulations; slight effervescence; mildly alkaline.

The solum ranges from 37 to 50 inches in thickness. The depth to free carbonates ranges from 33 to 49 inches. The mollic epipedon ranges from 10 to 21 inches in thickness. The clay content in the control section ranges from 27 to 35 percent.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The 2Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is gravelly clay loam, clay loam, silty clay loam, or loam. It is medium acid to mildly alkaline. The 3BC and 3C horizons are neutral to moderately alkaline.

Varna Series

The Varna series consists of moderately well drained, slowly permeable or moderately slowly permeable soils on till plains and moraines. These soils formed in loess and in the underlying silty clay loam glacial till. Slope ranges from 1 to 5 percent.

Varna soils are similar to Dana and Symerton soils and commonly are adjacent to Ashkum and Elliott soils. The poorly drained Ashkum soils do not have an argillic horizon and are in depressions and drainageways below Varna soils. The somewhat poorly drained Elliott soils are in slightly lower positions than those of Varna soils. Symerton soils have more gravel and sand and less clay in the control section than Varna soils. Dana soils have less clay in the control section than Varna soils.

Typical pedon of Varna silt loam, 1 to 5 percent slopes, eroded, 850 feet south and 150 feet east of the northwest corner of sec. 31, T. 29 N., R. 9 E.

Ap—0 to 12 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular and subangular blocky structure; friable; dark yellowish brown (10YR 4/4) streaks and fragments of subsoil material; neutral; abrupt smooth boundary.

2Bt1—12 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium angular blocky structure; firm; many distinct dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2Bt2—18 to 27 inches; olive brown (2.5Y 4/4) silty clay;

common fine prominent light olive gray (5Y 6/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common distinct dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2BC—27 to 39 inches; olive brown (2.5Y 4/4) silty clay loam; many medium prominent light olive gray (5Y 6/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; common faint grayish brown (2.5Y 5/2) clay films on faces of peds; strong effervescence; moderately alkaline; gradual wavy boundary.

2C—39 to 60 inches; mottled light olive brown (2.5Y 5/4), light gray (5Y 6/1), and yellowish brown (10YR 5/6) silty clay loam; massive; firm; common greenish gray (5GY 6/1) pressure faces; strong effervescence; moderately alkaline.

The solum ranges from 25 to 41 inches in thickness. The depth to free carbonates is 22 to 41 inches. The mollic epipedon ranges from 7 to 12 inches in thickness. The clay content in the control section ranges from 35 to 50 percent.

The Ap horizon has chroma of 1 to 4. The 2Bt horizon has value of 4 or 5 and chroma of 2 to 4. It is medium acid to neutral.

Zook Series

The Zook series consists of poorly drained, slowly permeable soils on flood plains. These soils formed in silty and clayey alluvium. Slope ranges from 0 to 2 percent.

Zook soils are similar to Sawmill soils and commonly are adjacent to Chatsworth, Clarence, and Swygert soils. The moderately well drained Chatsworth soils and the somewhat poorly drained Clarence and Swygert soils are not subject to flooding and are in higher positions than those of Zook soils. Sawmill soils have less clay in the control section than Zook soils.

Typical pedon of Zook silty clay loam, 1,432 feet north and 180 feet west of the southeast corner of sec. 11, T. 25 N., R. 9 E.

Ap1—0 to 11 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; neutral; clear smooth boundary.

Ap2—11 to 17 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak very fine granular structure; friable; neutral; clear smooth boundary.

AB—17 to 25 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine granular structure; friable; neutral; gradual smooth boundary.

Bg1—25 to 38 inches; black (10YR 2/1) silty clay; many medium prominent dark gray (5Y 4/1) mottles; weak fine angular blocky structure; firm; mildly alkaline; gradual smooth boundary.

Bg2—38 to 45 inches; black (10YR 2/1) silty clay; many medium prominent dark gray (5Y 4/1) mottles; weak fine prismatic structure parting to weak fine angular blocky; firm; mildly alkaline; gradual smooth boundary.

BCg—45 to 50 inches; dark gray (5Y 4/1) silty clay; weak fine and medium prismatic structure; firm; few distinct black (10YR 2/1) organic coatings on faces of peds; few snail shells; slight effervescence; mildly alkaline.

Cg—50 to 60 inches; dark gray (5Y 4/1) silty clay; massive; firm; few snail shells; slight effervescence; mildly alkaline.

The solum is 50 to 53 inches thick. The mollic epipedon ranges from 36 to 50 inches in thickness. It typically includes the upper part of the Bg horizon. The clay content in the control section ranges from 36 to 45 percent.

The Ap or A horizon has value of 2 or 3. It is silty clay or silty clay loam. The Bg horizon has hue of 10YR or is neutral. It has value of 2 to 4 and chroma of 1 or 0. It is medium acid to mildly alkaline. In some pedons the Cg horizon does not have free carbonates.

Formation of the Soils

The processes involved in the formation of soils are numerous and are interrelated in a very complex way. These processes can be grouped into five major factors—the physical and mineralogical composition of the parent material; relief; the kind of plant and animal life on or in the soil, especially the native vegetation; the climate, especially rainfall and temperature; and the length of time that soil-forming processes have acted on the parent material *(6)*.

In Ford County parent material and relief are the most influential factors of soil formation. These factors vary more within the county than climate, native vegetation, and time, which are relatively constant. The parent material has left the strongest imprint on the soils in the county.

Parent Material

The strong influence of parent material on the soils in Ford County was recognized in the first soil survey of the county *(7, 8)*. The dominant parent materials were deposited during the Woodfordian Substage of the Wisconsinan Glaciation, about 12,500 to 22,000 years ago *(13)*. Four distinct methods of deposition have resulted in four types of deposits—glacial till, glacial outwash, lacustrine material, and loess. These deposits are in a complex pattern of intertwining till plains and moraines, outwash plains, and lake plains. Varying amounts of loess overlie the other deposits. Soil properties vary among these types of deposits, and they also vary somewhat within the types. In a few areas soils formed in material that was deposited in more recent times, such as alluvium and organic material.

Glacial till was deposited directly with the melting of the ice sheets. The deposits are generally uniform within relatively short horizontal and vertical distances. The glacial till is calcareous and is firm or very firm. It varies greatly in texture from one place to another. This variation directly causes differences among the soils. Clarence and Rowe soils formed in silty clay and clay till. Bryce and Swygert soils formed in silty clay till and are more permeable in the upper part than Clarence and Rowe soils. Ashkum and Elliott soils formed in silty clay loam till. Dana and Raub soils formed in loam and silt loam till. In general, soils formed in the loamy and silty till have a solum that is thicker than that of soils formed in the clayey till.

Glacial outwash was deposited by moving water in front of the melting ice sheets. Layers of deposition are readily apparent within very short vertical distances but are less obvious within horizontal distances. The outwash in Ford County is silty, loamy, and sandy and in some areas has gravelly layers. It is generally friable. Onarga and Ridgeville soils formed in outwash.

Lacustrine material was deposited in the relatively still water of glacial lakes, such as glacial Lake Watseka. Vertical variation is greater than horizontal variation. The layers are commonly thicker than those in glacial outwash. The lacustrine material is silty and clayey and is friable or firm. Pella, Milford, and Martinton are examples of soils in glacial lakebeds. Many other soils, including Rutland soils, show evidence of lacustrine material deposited on top of till. Also, narrow outwash ridges are beach deposits of past shorelines of glacial lakes. Selma, Ridgeville, and Onarga are examples of outwash soils on beach ridges.

Loess is wind deposited, silty material that covers the till, outwash, and lacustrine material throughout most of the county. It is generally uniform within vertical and horizontal distances. It ranges from about 30 inches thick in the western part of the county to about 10 inches thick in the southeastern part. It is most common in the upper part of Drummer, Dana, Proctor, and Brenton soils.

Alluvium is material recently deposited by floodwater. It is silty or clayey and is friable or firm. The texture depends on the velocity of the floodwater and the texture of the sediment in the water. Sawmill and Zook soils formed in alluvium.

Organic material is decomposed plant and animal remains. Soils that formed in this material are naturally wet during most of the year and are in depressions that are heavily vegetated with grasses and wetland plants.

Houghton soils formed in organic material.

Relief

Elevation and slope affect many soil properties in a humid climate. Soils in high, nearly level areas generally are more strongly developed than soils in low areas or soils in sloping areas. In the higher areas most of the precipitation penetrates the surface and percolates through the soil. Soils in sloping areas generally are less strongly developed because less precipitation percolates through the profile. Also, the water lost through runoff erodes some of the soil as it forms in the surface layer. The nearly level, somewhat poorly drained Raub soils are more highly developed than the moderately sloping, moderately well drained, severely eroded Chatsworth soils. Relief also influences the depth to the seasonal high water table. The water table generally is at or above the surface in low areas. It generally is at a greater depth in the higher adjacent areas.

Native Vegetation

Prairie grasses once covered about 98 percent of the acreage in Ford County. Therefore, most of the soils have a dark, fertile, relatively thick surface soil. The soils in the rest of the county formed under forest vegetation. Their surface layer is lighter colored and generally thinner than that in soils formed under grasses. Blount, Camden, Del Rey, and Morley are the only soils in the county that formed under forest vegetation.

Climate

The climate in Ford County is humid, temperate, and continental. If the other factors of soil formation are equal, the effect of climate on soil variability is slight.

Time

The length of time that the soil-forming processes have affected the parent material influences the degree of profile development. In general, the soils in Ford County are young. Differences in the degree of profile development result from variations in the kind of parent material and in relief. The length of time available for soil formation can be altered by the loss of soil material through erosion.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vols., illus.

(2) American Society for Testing and Materials. 1985. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Fehrenbacher, Joe B., Robert A. Pope, Ivan J. Jansen, John D. Alexander, and Burt W. Ray. 1978. Soil productivity in Illinois. Coop. Ext. Serv. Circ. 1156, 21 pp., illus.

(4) Ford County Historical Society. 1884. Historical atlas of Ford County, Illinois. J.H. Beers & Co., Chicago, Illinois, 83 pp., illus.

(5) Illinois Cooperative Crop Reporting Service. 1982. Illinois agricultural statistics annual summary. Illinois Coop. Crop Rep. Serv. Bull. 82-1, 102 pp., illus.

(6) Jenny, Hans. 1941. Factors of soil formation. McGraw-Hill Book Company, Inc., 281 pp., illus.

(7) Smith, R.S., Herman C. Wascher, and Guy D. Smith. 1941. Ford County soils. Univ. Illinois Agric. Exp. Stn. Soil Rep. 54, rev., 26 pp., illus.

(8) Stauffer, R.S. 1935. Influence of parent material on soil character in a humid, temperate climate. Jour. Amer. Soc. Agron. 27: 885-894.

(9) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962.)

(10) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(11) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(12) United States Department of Commerce, Bureau of the Census. 1977. 1974 census of agriculture. Vol. 1, part 13, 928 pp.

(13) Willman, H.B., and John C. Frye. 1970. Pleistocene stratigraphy of Illinois. Illinois Geol. Surv. Bull. 94, 204 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil

readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders

transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 nches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the

immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation

of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns, and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Kankakee, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	30.8	14.2	22.5	56	-17	0.3	1.53	0.65	2.48	4	7.6
February----	35.7	18.6	27.2	58	-10	1.4	1.36	.71	2.14	4	5.6
March-------	46.7	28.2	37.5	73	4	19.8	2.46	1.41	3.66	6	4.0
April-------	61.7	39.7	50.7	84	21	130.3	4.02	2.67	4.98	8	.6
May---------	73.5	49.5	61.5	92	31	368.3	3.93	2.36	5.37	7	.0
June--------	82.6	59.2	70.9	97	42	623.1	4.15	2.12	5.94	7	.0
July--------	85.5	62.8	74.4	99	48	747.4	4.51	2.30	6.42	6	.0
August------	83.5	60.8	72.2	95	44	679.6	3.46	1.53	5.12	6	.0
September---	78.4	53.5	65.9	95	34	472.0	3.22	1.18	4.42	5	.0
October-----	66.3	42.2	54.2	87	23	188.1	2.39	.89	3.60	5	.1
November----	49.7	31.5	40.6	74	9	32.2	2.01	1.20	2.39	5	1.9
December----	36.2	21.1	28.7	63	-8	2.2	2.04	.69	3.05	5	5.0
Yearly:											
Average---	61.1	40.3	50.7	---	---	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,264.7	35.08	17.71	49.57	68	24.8

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at Kankakee, Illinois)

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 16	May 6	May 10
2 years in 10 later than--	Apr. 10	Apr. 20	May 4
5 years in 10 later than--	Mar. 31	Apr. 10	Apr. 24
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 10	Oct. 6	Sept. 20
2 years in 10 earlier than--	Oct. 23	Oct. 18	Oct. 2
5 years in 10 earlier than--	Nov. 3	Oct. 28	Oct. 13

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Kankakee, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	191	169	145
8 years in 10	200	177	151
5 years in 10	215	200	172
2 years in 10	232	218	188
1 year in 10	244	227	192

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
23A	Blount silt loam, 0 to 3 percent slopes	886	0.3
56B	Dana silt loam, 1 to 5 percent slopes	4,206	1.3
67	Harpster silty clay loam	364	0.1
69	Milford silty clay loam	22,223	7.1
91A	Swygert silty clay loam, 0 to 2 percent slopes	16,385	5.2
91B2	Swygert silty clay loam, 2 to 5 percent slopes, eroded	10,315	3.3
102	La Hogue loam	667	0.2
103	Houghton muck	385	0.1
107	Sawmill silty clay loam	2,465	0.8
125	Selma loam	2,012	0.6
134A	Camden silt loam, 0 to 3 percent slopes	853	0.3
146A	Elliott silt loam, 0 to 2 percent slopes	29,987	9.6
146B2	Elliott silt loam, 2 to 5 percent slopes, eroded	16,196	5.2
147A	Clarence silty clay loam, 0 to 2 percent slopes	5,181	1.7
147B2	Clarence silty clay, 2 to 5 percent slopes, eroded	4,208	1.3
148B	Proctor silt loam, 1 to 5 percent slopes	2,916	0.9
149	Brenton silt loam	9,135	2.9
150B	Onarga fine sandy loam, 1 to 5 percent slopes	183	0.1
151	Ridgeville fine sandy loam	287	0.1
152	Drummer silty clay loam	31,149	10.0
153	Pella silty clay loam	22,718	7.3
189	Martinton silt loam	3,370	1.1
192	Del Rey silt loam	1,043	0.3
194B	Morley silt loam, 1 to 5 percent slopes	371	0.1
223B2	Varna silt loam, 1 to 5 percent slopes, eroded	750	0.2
230	Rowe silty clay loam	11,971	3.8
232	Ashkum silty clay loam	45,937	14.8
235	Bryce silty clay loam	43,885	14.1
238	Rantoul silty clay	1,254	0.4
241C	Chatsworth silty clay, 4 to 10 percent slopes	2,237	0.7
294B	Symerton silt loam, 1 to 5 percent slopes	445	0.1
330	Peotone silty clay loam	2,320	0.7
375B	Rutland silt loam, 1 to 5 percent slopes	9,844	3.2
405	Zook silty clay loam	824	0.3
440B	Jasper loam, 1 to 5 percent slopes	660	0.2
481A	Raub silt loam, 0 to 3 percent slopes	3,385	1.1
495C3	Corwin clay loam, 5 to 10 percent slopes, severely eroded	482	0.2
805	Orthents, clayey	158	0.1
865	Pits, gravel	318	0.1
	Water	345	0.1
	Total	312,320	100.0

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
23A	Blount silt loam, 0 to 3 percent slopes (where drained)
56B	Dana silt loam, 1 to 5 percent slopes
67	Harpster silty clay loam (where drained)
69	Milford silty clay loam (where drained)
91A	Swygert silty clay loam, 0 to 2 percent slopes
91B2	Swygert silty clay loam, 2 to 5 percent slopes, eroded
102	La Hogue loam
107	Sawmill silty clay loam (where drained and either protected from flooding or not frequently flooded during the growing season)
125	Selma loam (where drained)
134A	Camden silt loam, 0 to 3 percent slopes
146A	Elliott silt loam, 0 to 2 percent slopes
146B2	Elliott silt loam, 2 to 5 percent slopes, eroded
148B	Proctor silt loam, 1 to 5 percent slopes
149	Brenton silt loam
150B	Onarga fine sandy loam, 1 to 5 percent slopes
151	Ridgeville fine sandy loam
152	Drummer silty clay loam (where drained)
153	Pella silty clay loam (where drained)
189	Martinton silt loam
192	Del Rey silt loam (where drained)
194B	Morley silt loam, 1 to 5 percent slopes
223B2	Varna silt loam, 1 to 5 percent slopes, eroded
230	Rowe silty clay loam (where drained)
232	Ashkum silty clay loam (where drained)
235	Bryce silty clay loam (where drained)
294B	Symerton silt loam, 1 to 5 percent slopes
330	Peotone silty clay loam (where drained)
375B	Rutland silt loam, 1 to 5 percent slopes
405	Zook silty clay loam (where drained and either protected from flooding or not frequently flooded during the growing season)
440B	Jasper loam, 1 to 5 percent slopes
481A	Raub silt loam, 0 to 3 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Bromegrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
23A------------- Blount	IIw	106	35	48	64	4.3	7.1
56B------------- Dana	IIe	142	46	59	84	5.5	9.1
67-------------- Harpster	IIw	136	44	52	74	5.0	8.3
69-------------- Milford	IIw	131	48	56	81	5.2	8.6
91A------------- Swygert	IIw	114	39	51	73	4.5	7.5
91B2------------ Swygert	IIe	107	37	48	69	4.2	7.0
102------------- La Hogue	I	129	43	56	80	5.2	8.6
103------------- Houghton	Vw	---	---	---	---	---	---
107------------- Sawmill	IIIw	132	42	---	---	4.9	8.1
125------------- Selma	IIw	136	44	53	76	5.0	8.3
134A------------ Camden	I	125	39	55	72	5.0	8.3
146A------------ Elliott	IIw	128	45	55	79	5.1	8.5
146B2----------- Elliott	IIe	115	43	50	71	4.6	7.7
147A------------ Clarence	IIIw	100	35	47	66	4.1	6.8
147B2----------- Clarence	IIIe	94	33	44	62	3.8	6.4
148B------------ Proctor	IIe	143	44	58	87	5.4	9.1
149------------- Brenton	I	160	47	62	91	5.9	9.8
150B------------ Onarga	IIe	110	36	48	74	4.2	7.0
151------------- Ridgeville	IIs	115	40	53	75	4.6	7.7

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Bromegrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
152------------- Drummer	IIw	154	51	61	83	5.5	9.2
153------------- Pella	IIw	140	48	56	78	5.2	8.6
189------------- Martinton	IIw	135	45	57	84	5.3	8.8
192------------- Del Rey	IIw	115	37	49	69	4.5	7.5
194B------------ Morley	IIe	102	35	47	63	4.3	7.0
223B2----------- Varna	IIe	120	40	51	72	4.7	7.8
230------------- Rowe	IIIw	108	40	45	63	4.0	6.7
232------------- Ashkum	IIw	130	47	54	79	5.0	8.3
235------------- Bryce	IIw	120	43	48	70	4.4	7.3
238------------- Rantoul	IIIw	99	35	36	50	3.2	5.3
241C------------ Chatsworth	VIe	---	---	---	---	---	1.6
294B------------ Symerton	IIe	135	44	58	82	5.3	8.9
330------------- Peotone	IIw	123	42	43	58	---	---
375B------------ Rutland	IIe	131	45	58	83	5.2	8.7
405------------- Zook	IIw	92	35	---	---	3.5	5.8
440B------------ Jasper	IIe	136	41	56	87	5.2	8.7
481A------------ Raub	I	155	51	63	92	6.1	10.1
495C3----------- Corwin	IVe	115	38	51	72	4.6	7.6
805. Orthents							
865**. Pits							

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
23A------------- Blount	3C	Slight	Slight	Severe	Severe	White oak-----------	65	48	Eastern white pine, Scotch pine, eastern redcedar, red pine, yellow poplar.
						Northern red oak----	65	48	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
						Pin oak-------------	---	---	
103------------- Houghton	2W	Slight	Severe	Severe	Severe	White ash-----------	51	35	
						Red maple-----------	51	33	
						Black willow--------	---	---	
						Quaking aspen-------	56	56	
						Silver maple--------	76	30	
107------------- Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak-------------	90	72	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
134A------------ Camden	7A	Slight	Slight	Slight	Slight	Yellow poplar-------	95	98	White oak, black walnut, green ash, eastern white pine, red pine, yellow poplar, black locust, white ash.
						White oak-----------	85	67	
						Northern red oak----	85	67	
						Sweetgum------------	80	79	
						Green ash-----------	76	75	
192------------- Del Rey	4C	Slight	Slight	Severe	Severe	White oak-----------	70	52	Austrian pine, eastern redcedar, green ash, pin oak, red maple.
						Northern red oak----	70	52	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
194B------------ Morley	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	White oak, black walnut, green ash, eastern white pine, Norway spruce, red pine, white spruce.
						Northern red oak----	80	62	
						Yellow poplar-------	90	90	
						Black walnut--------	---	---	
						Bur oak-------------	---	---	
						Shagbark hickory----	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
23A--------------- Blount	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
56B--------------- Dana	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
67---------------- Harpster	---	Nannyberry viburnum, Washington hawthorn.	White spruce, northern whitecedar, eastern redcedar, green ash, Osageorange.	Black willow------	---
69---------------- Milford	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
91A, 91B2--------- Swygert	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak-----------	---
102--------------- La Hogue	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
103--------------- Houghton	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
107--------------- Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
125 Selma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
134A Camden	---	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
146A. Elliott					
146B2 Elliott	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
147A Clarence	---	Eastern redcedar, American cranberrybush, Amur privet, Washington hawthorn, Amur honeysuckle, autumn olive.	Austrian pine, green ash, Osageorange.	Eastern white pine, pin oak.	---
147B2 Clarence	Lilac, Amur honeysuckle.	Eastern redcedar	Austrian pine	---	---
148B Proctor	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
149 Brenton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
150B Onarga	---	Amur privet, Washington hawthorn, American cranberrybush, Amur honeysuckle.	Austrian pine, northern whitecedar, Osageorange, eastern redcedar.	Red pine, Norway spruce, eastern white pine.	---
151 Ridgeville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
152 Drummer	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine	Pin oak.
153 Pella	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
189 Martinton	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
192 Del Rey	---	Amur privet, arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osageorange.	Eastern white pine, pin oak.	---
194B Morley	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
223B2 Varna	---	Eastern redcedar, Washington hawthorn, Amur honeysuckle, Amur privet, arrowwood, American cranberrybush.	Austrian pine, green ash, Osageorange.	Eastern white pine, pin oak.	---
230 Rowe	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern whitecedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
232 Ashkum	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
235 Bryce	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
238 Rantoul	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
241C Chatsworth	Lilac, Amur honeysuckle.	Eastern redcedar	Austrian pine, Virginia pine.	---	---
294B Symerton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, blue spruce, white fir, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
330 Peotone	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
375B Rutland	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
405 Zook	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Norway spruce, northern whitecedar, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
440B. Jasper	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
481A. Raub	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
495C3. Corwin	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
805. Orthents					
865*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
23A Blount	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
56B Dana	Slight	Slight	Moderate: slope.	Slight	Slight.
67 Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
69 Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
91A, 91B2 Swygert	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
102 La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
103 Houghton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.
107 Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
125 Selma	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
134A Camden	Slight	Slight	Slight	Slight	Slight.
146A, 146B2 Elliott	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
147A Clarence	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
147B2 Clarence	Severe: wetness, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: too clayey.	Severe: too clayey.
148B Proctor	Slight	Slight	Moderate: slope.	Slight	Slight.
149 Brenton	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
150B Onarga	Slight	Slight	Moderate: slope.	Slight	Slight.
151 Ridgeville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
152: Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
153: Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
189: Martinton	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
192: Del Rey	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
194B: Morley	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
223B2: Varna	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
230: Rowe	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
232: Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
235: Bryce	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
238: Rantoul	Severe: ponding, percs slowly, too clayey.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
241C: Chatsworth	Severe: percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: slope, too clayey, percs slowly.	Severe: too clayey.	Severe: droughty, too clayey.
294B: Symerton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
330: Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
375B: Rutland	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
405: Zook	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
440B: Jasper	Slight	Slight	Moderate: slope.	Slight	Slight.
481A: Raub	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
495C3----------------- Corwin	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight----------	Slight.
805. Orthents					
865*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
23A Blount	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
56B Dana	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
67 Harpster	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
69 Milford	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
91A, 91B2 Swygert	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
102 La Hogue	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
103 Houghton	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
107 Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
125 Selma	Good	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
134A Camden	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
146A Elliott	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
146B2 Elliott	Fair	Good	Good	Good	Poor	Poor	Good	Good	Poor.
147A Clarence	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
147B2 Clarence	Fair	Fair	Poor	Fair	Poor	Very poor	Fair	Fair	Very poor.
148B Proctor	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
149 Brenton	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
150B Onarga	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
151 Ridgeville	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
152 Drummer	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
153---------------- Pella	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
189---------------- Martinton	Fair	Good	Fair	Good	Fair	Fair	Fair	Good	Fair.
192---------------- Del Rey	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
194E--------------- Morley	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
223B2-------------- Varna	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
230---------------- Rowe	Poor	Fair	Poor	Fair	Good	Good	Fair	Fair	Good.
232---------------- Ashkum	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
235---------------- Bryce	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
238---------------- Rantoul	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
241C--------------- Chatsworth	Very poor	Poor	Poor	Very poor	Very poor	Very poor	Poor	Very poor	Very poor.
294B--------------- Symerton	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
330---------------- Peotone	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
375B--------------- Rutland	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
405---------------- Zook	Good	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
440B--------------- Jasper	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
481A--------------- Raub	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
495C3-------------- Corwin	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
805. Orthents									
865*. Pits									

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
23A: Blount	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
56B: Dana	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
69: Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
91A, 91B2: Swygert	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, frost action, shrink-swell.	Slight.
102: La Hogue	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
103: Houghton	Severe: ponding, excess humus.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: excess humus, ponding.
107: Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
125: Selma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
134A: Camden	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
146A, 146B2: Elliott	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
147A: Clarence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
147B2: Clarence	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Severe: too clayey.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
148B----------- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
149----------- Brenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
150B----------- Onarga	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
151----------- Ridgeville	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
152----------- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
153----------- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
189----------- Martinton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
192----------- Del Rey	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
194B----------- Morley	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
223B2----------- Varna	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
230----------- Rowe	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding.
232----------- Ashkum	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
235----------- Bryce	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
238----------- Rantoul	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
241C: Chatsworth	Moderate: too clayey, dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Severe: droughty, too clayey.
294B: Symerton	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
330: Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
375B: Rutland	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
405: Zook	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, flooding.
440B: Jasper	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: low strength, frost action.	Slight.
481A: Raub	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
495C3: Corwin	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: shrink-swell, low strength, wetness.	Slight.
805. Orthents						
865*. Pits						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "poor," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
23A----------------- Blount	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
56B----------------- Dana	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight-----------	Fair: too clayey, wetness.
67------------------ Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
69------------------ Milford	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
91A----------------- Swygert	Severe: wetness, percs slowly.	Slight-----------	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
91B2---------------- Swygert	Severe: wetness, percs slowly.	Moderate: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
102----------------- La Hogue	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
103----------------- Houghton	Severe: ponding, percs slowly.	Severe: seepage, ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, seepage.	Poor: ponding, excess humus.
107----------------- Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
125----------------- Selma	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
134A---------------- Camden	Slight-----------	Moderate: seepage.	Severe: seepage.	Slight-----------	Fair: too clayey.
146A, 146B2--------- Elliott	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
147A---------------- Clarence	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
147B2: Clarence	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
148B: Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey, thin layer.
149: Brenton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
150B: Onarga	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
151: Ridgeville	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness.	Poor: seepage, too sandy, wetness.
152: Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
153: Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
189: Martinton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
192: Del Rey	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
194B: Morley	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
223B2: Varna	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Slight	Fair: too clayey, wetness.
230: Rowe	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
232: Ashkum	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, ponding.
235: Bryce	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
238: Rantoul	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
241C----------------- Chatsworth	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
294B----------------- Symerton	Severe: wetness, percs slowly.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
330------------------ Peotone	Severe: ponding, percs slowly.	Slight-----------	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
375B----------------- Rutland	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
405------------------ Zook	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
440B----------------- Jasper	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, thin layer.
481A----------------- Raub	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
495C3---------------- Corwin	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
805. Orthents					
865*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
23A------------------ Blount	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
56B------------------ Dana	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
67------------------- Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
69------------------- Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
91A, 91B2------------ Swygert	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
102------------------ La Hogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
103------------------ Houghton	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness, excess humus.
107------------------ Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
125------------------ Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
134A----------------- Camden	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.
146A, 146B2---------- Elliott	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
147A----------------- Clarence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, small stones.
147B2---------------- Clarence	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
148B----------------- Proctor	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
149------------------ Brenton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
150B----------------- Onarga	Good-----------------	Probable-------------	Improbable: too sandy.	Fair: area reclaim, thin layer.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
151------------------- Ridgeville	Fair: wetness.	Probable------------	Improbable: too sandy.	Good.
152------------------- Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
153------------------- Pella	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
189------------------- Martinton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
192------------------- Del Rey	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
194B------------------ Morley	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
223B2----------------- Varna	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
230------------------- Rowe	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
232------------------- Ashkum	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
235------------------- Bryce	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
238------------------- Rantoul	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
241C------------------ Chatsworth	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
294B------------------ Symerton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
330------------------- Peotone	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
375B------------------ Rutland	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
405------------------- Zook	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
440B------------------ Jasper	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
481A------------------ Raub	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
495C3----------------- Corwin	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, small stones.
805. Orthents				
865*. Pits				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
23A Blount	Slight	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily.
56B Dana	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
67 Harpster	Moderate: seepage.	Moderate: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
69 Milford	Slight	Severe: slow refill.	Ponding, frost action.	Ponding	Erodes easily, ponding.	Wetness, erodes easily.
91A Swygert	Slight	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly, erodes easily.	Percs slowly, erodes easily.
91B2 Swygert	Moderate: slope.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly, erodes easily.	Percs slowly, erodes easily.
102 La Hogue	Severe: seepage.	Severe: cutbanks cave.	Frost action	Wetness	Wetness	Wetness.
103 Houghton	Severe: seepage.	Severe: slow refill.	Frost action, subsides, ponding.	Soil blowing, ponding.	Ponding, soil blowing.	Wetness.
107 Sawmill	Moderate: seepage.	Moderate: slow refill.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
125 Selma	Severe: seepage.	Severe: cutbanks cave.	Ponding, frost action.	Ponding	Ponding	Wetness.
134A Camden	Moderate: seepage.	Severe: no water.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
146A Elliott	Slight	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
146B2 Elliott	Moderate: slope.	Severe: slow refill.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.
147A Clarence	Slight	Severe: no water.	Percs slowly	Wetness	Wetness, percs slowly.	Wetness, rooting depth, erodes easily.
147B2 Clarence	Moderate: slope.	Severe: no water.	Percs slowly, slope.	Wetness, droughty, slow intake.	Wetness, percs slowly.	Wetness, rooting depth.
148B Proctor	Severe: seepage.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
149--------------- Brenton	Moderate: seepage.	Severe: cutbanks cave.	Frost action---	Wetness--------	Wetness--------	Wetness.
150B-------------- Onarga	Severe: seepage.	Severe: no water.	Deep to water	Soil blowing, slope.	Soil blowing---	Favorable.
151--------------- Ridgeville	Moderate: seepage.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
152--------------- Drummer	Moderate: seepage.	Moderate: slow refill.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
153--------------- Pella	Moderate: seepage.	Moderate: slow refill.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
189--------------- Martinton	Slight---------	Severe: slow refill.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
192--------------- Del Rey	Slight---------	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
194B-------------- Morley	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, slope.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
223B2------------- Varna	Moderate: slope.	Severe: no water.	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
230--------------- Rowe	Slight---------	Severe: slow refill.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
232--------------- Ashkum	Slight---------	Severe: slow refill.	Ponding, frost action.	Ponding, rooting depth.	Ponding--------	Wetness, rooting depth.
235--------------- Bryce	Slight---------	Severe: slow refill.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
238--------------- Rantoul	Slight---------	Severe: no water.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
241C-------------- Chatsworth	Moderate: slope.	Severe: no water.	Deep to water	Droughty, slow intake, percs slowly.	Percs slowly---	Droughty.
294B-------------- Symerton	Moderate: seepage, slope.	Severe: slow refill.	Deep to water	Slope----------	Erodes easily	Erodes easily.
330--------------- Peotone	Slight---------	Severe: slow refill.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
375B-------------- Rutland	Moderate: slope.	Severe: slow refill.	Frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
405--------------- Zook	Slight---------	Severe: slow refill.	Percs slowly, flooding, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
440B------------- Jasper	Moderate: seepage, slope.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
481A------------- Raub	Slight---------	Severe: slow refill.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
495C3------------ Corwin	Moderate: seepage, slope.	Severe: slow refill.	Slope----------	Wetness, rooting depth, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
805. Orthents						
865*. Pits						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
23A--------------- Blount	0-12	Silt loam--------	CL	A-6, A-4	0-5	95-100	95-100	90-100	80-95	25-40	8-20
	12-33	Silty clay loam, silty clay, clay loam.	CH, CL	A-7, A-6	0-5	95-100	90-100	80-90	75-85	35-60	15-35
	33-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	90-100	90-100	80-100	70-90	30-45	10-25
56B--------------- Dana	0-19	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	85-95	30-35	8-12
	19-29	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-98	38-50	20-32
	29-49	Clay loam--------	CL	A-6, A-7	0	90-100	90-100	80-90	65-75	37-50	17-30
	49-72	Loam, silt loam	CL, ML, CL-ML	A-4, A-6	0-3	85-95	80-100	75-85	50-65	17-30	2-14
67--------------- Harpster	0-18	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	18-36	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	85-100	40-60	20-35
	36-41	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	70-100	35-55	20-35
	41-60	Stratified sandy loam to clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0	100	95-100	95-100	45-95	20-50	5-25
69--------------- Milford	0-16	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	75-95	40-60	20-35
	16-52	Silty clay, silty clay loam, clay loam.	CH, CL	A-7	0	100	95-100	90-100	75-100	40-60	20-40
	52-60	Stratified silty clay loam to loam.	CL, SC	A-6, A-7	0	97-100	95-100	90-100	45-100	25-50	10-30
91A--------------- Swygert	0-9	Silty clay loam	CL	A-7, A-6	0	100	95-100	95-100	85-95	35-50	15-25
	9-18	Silty clay, silty clay loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	85-95	35-55	15-30
	18-48	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	48-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0-5	95-100	95-100	90-100	75-95	40-65	20-40
91B2-------------- Swygert	0-6	Silty clay loam	CL	A-7, A-6	0	100	95-100	95-100	85-95	35-50	15-25
	6-37	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	75-95	50-60	25-35
	37-60	Silty clay loam, silty clay, clay.	CH, CL	A-7	0-5	95-100	95-100	90-100	75-95	40-65	20-40
102--------------- La Hogue	0-16	Loam-------------	ML, CL, CL-ML	A-4	0	100	95-100	80-100	50-80	20-35	3-10
	16-32	Sandy clay loam, clay loam.	CL, SC	A-6, A-4	0	100	100	80-100	40-85	25-40	8-20
	32-39	Sandy loam, loamy sand, silt loam.	ML, CL, SM, SC	A-2, A-4, A-6	0	100	90-100	75-90	15-70	15-30	2-15
	39-60	Stratified loamy sand to silt loam.	CL, ML, SC, SM	A-4, A-2	0	90-100	80-100	50-95	10-60	<25	NP-10
103--------------- Houghton	0-60	Sapric material	PT	A-8	0	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
107-------------- Sawmill	0-14	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	14-29	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	29-48	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	48-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
125-------------- Selma	0-21	Loam------------	CL	A-4, A-6	0	100	98-100	80-100	55-85	25-35	7-17
	21-46	Sandy loam, loam, clay loam.	CL, SC	A-6	0	100	95-100	80-95	38-85	24-36	11-19
	46-60	Stratified sandy loam to silt loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	0	90-100	85-100	60-90	30-70	15-35	5-20
134A------------- Camden	0-13	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	13-38	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	90-100	25-40	15-25
	38-56	Clay loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0-5	90-100	80-100	60-100	30-70	20-40	3-15
	56-60	Stratified gravelly sandy loam to silt loam.	SM, SC, ML, CL	A-2, A-4	0-5	90-100	80-100	50-80	20-60	<25	3-10
146A------------- Elliott	0-8	Silt loam--------	CL	A-6, A-4	0	95-100	95-100	95-100	75-100	30-40	8-18
	8-38	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	38-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	90-100	85-100	80-100	70-95	28-45	11-24
146B2------------ Elliott	0-6	Silt loam--------	CL	A-6, A-4	0	95-100	95-100	95-100	75-100	30-40	8-18
	6-26	Silty clay, silty clay loam, clay.	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	70-100	30-52	11-26
	26-60	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0-5	90-100	85-100	80-100	70-95	28-45	11-24
147A------------- Clarence	0-11	Silty clay loam	CL	A-6, A-7	0	95-100	95-100	90-100	85-100	30-45	15-25
	11-34	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	34-60	Silty clay, clay	CL, CH	A-7	0-5	95-100	95-100	90-100	85-100	45-65	25-40
147B2------------ Clarence	0-9	Silty clay-------	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	25-35
	9-26	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	85-100	50-65	25-40
	26-60	Silty clay, clay	CL, CH	A-7	0-5	95-100	95-100	90-100	85-100	45-65	25-40
148B------------- Proctor	0-15	Silt loam--------	CL	A-6	0	100	100	95-100	85-100	25-40	10-22
	15-33	Silty clay loam	CL	A-7, A-6	0	95-100	90-100	85-100	85-100	25-50	10-25
	33-41	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0	90-100	85-100	75-100	65-80	25-45	10-25
	41-60	Stratified silt loam to loamy sand.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6	0	85-100	80-100	50-100	25-80	20-40	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
149----------------- Brenton	0-14	Silt loam--------	CL, ML	A-6, A-4	0	100	95-100	95-100	85-100	30-40	8-15
	14-34	Silty clay loam, silt loam.	CL, ML	A-6, A-7	0	100	95-100	95-100	85-100	35-50	10-25
	34-48	Clay loam, gravelly clay loam, silt loam.	CL	A-6, A-7	0	100	85-100	90-100	75-95	30-45	10-20
	48-60	Stratified gravelly sandy loam to silt loam.	CL-ML, CL, SM-SC, SC	A-2, A-4, A-6	0	95-100	85-100	80-100	30-85	20-35	5-20
150B--------------- Onarga	0-10	Fine sandy loam	SC, SM, SM-SC	A-4, A-6, A-2	0	100	100	75-95	25-50	<28	NP-12
	10-29	Loam, sandy loam, fine sandy loam.	SC, CL, SM-SC, CL-ML	A-4, A-6, A-2-4, A-2-6	0	95-100	95-100	75-95	30-60	19-32	5-14
	29-60	Stratified fine sand to fine sandy loam.	SM, SP-SM, SM-SC	A-2, A-4	0	85-100	80-100	70-95	12-50	<20	NP-6
151----------------- Ridgeville	0-12	Fine sandy loam	SC, SM, SM-SC	A-2, A-4, A-6	0	100	100	90-100	18-50	10-29	NP-12
	12-25	Very fine sandy loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-4, A-6	0	95-100	95-100	75-95	36-60	20-34	5-14
	25-60	Stratified sand to sandy loam.	SM, SM-SC, SC, SP-SM	A-2, A-4	0	90-100	90-100	70-98	12-50	<20	NP-8
152----------------- Drummer	0-16	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	16-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	44-55	Loam, silt loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	60-85	30-50	15-30
	55-60	Stratified sandy loam to silty clay loam.	SC, CL	A-4, A-6	0-5	95-100	85-95	75-95	45-80	20-35	7-20
153----------------- Pella	0-12	Silty clay loam	CL	A-7	0	100	95-100	90-100	85-95	40-50	15-25
	12-33	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	95-100	90-100	85-95	30-50	15-30
	33-42	Silt loam, loam, sandy loam.	CL	A-6, A-7	0-5	95-100	90-100	85-95	60-90	25-45	10-25
	42-60	Stratified sandy loam to silty clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	0-5	90-100	80-100	50-100	30-85	20-35	7-20
189----------------- Martinton	0-10	Silt loam--------	ML	A-6, A-7	0	95-100	95-100	90-100	75-95	34-49	10-19
	10-51	Silty clay loam, silty clay.	CL	A-7, A-6	0	95-100	95-100	90-100	70-95	35-50	20-30
	51-60	Stratified sandy loam to silty clay.	CL, SC	A-6, A-7	0	90-100	80-100	75-100	35-90	25-45	10-25
192----------------- Del Rey	0-14	Silt loam--------	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	25-45	10-25
	14-52	Silty clay loam, silty clay.	CH, CL	A-7	0	95-100	95-100	90-100	85-95	40-55	20-30
	52-60	Silt loam, silty clay loam, silty clay.	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	30-45	10-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
194B------------- Morley	0-11	Silt loam--------	CL, CL-ML	A-6, A-4	0-5	95-100	95-100	90-100	75-95	25-40	5-15
	11-16	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-50	15-30
	16-29	Silty clay, silty clay loam, clay.	CL, CH	A-7	0-10	95-100	90-100	85-95	80-90	40-60	15-35
	29-40	Silty clay loam, clay loam, silty clay.	CL, CH	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-60	15-35
	40-60	Silty clay loam, clay loam.	CL	A-6, A-7	0-10	95-100	90-100	85-95	80-90	30-50	15-30
223B2------------ Varna	0-12	Silt loam--------	CL	A-6, A-4	0-5	95-100	95-100	95-100	85-95	25-40	8-20
	12-27	Silty clay, silty clay loam, clay.	CL, CH	A-7, A-6	0-10	95-100	85-100	85-98	80-98	35-56	15-29
	27-60	Silty clay loam, clay loam.	CL	A-7, A-6	0-10	95-100	85-100	85-98	80-95	30-45	13-26
230-------------- Rowe	0-14	Silty clay loam	CL, CH	A-6, A-7	0	100	95-100	90-100	85-95	35-60	15-35
	14-52	Silty clay, clay	CH	A-7	0-5	95-100	95-100	90-100	75-95	50-70	30-45
	52-60	Silty clay, clay	CL, CH	A-7	0-5	95-100	90-100	90-100	75-95	45-60	20-35
232-------------- Ashkum	0-15	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	75-100	40-60	20-35
	15-41	Silty clay loam, silty clay.	CL, CH	A-7	0	100	90-100	85-100	75-100	45-65	20-35
	41-60	Silty clay loam, silty clay.	CL	A-7, A-6	0-5	95-100	85-100	80-100	75-95	35-50	15-30
235-------------- Bryce	0-12	Silty clay loam	CH, CL	A-7	0	100	100	95-100	85-95	45-60	20-30
	12-43	Silty clay, clay	CH	A-7	0-5	95-100	95-100	95-100	75-95	50-60	25-35
	43-60	Silty clay, silty clay loam, clay.	CH, CL	A-7	0-5	95-100	90-100	90-100	75-95	40-65	20-40
238-------------- Rantoul	0-13	Silty clay-------	CH, CL	A-7	0	95-100	95-100	90-100	90-100	40-60	18-30
	13-38	Silty clay, clay	CH, CL, MH, ML	A-7	0	95-100	90-100	90-100	85-100	45-70	20-35
	38-60	Silty clay loam, silty clay, clay.	CH, CL, MH, ML	A-6, A-7	0-5	95-100	90-100	90-100	85-100	35-75	18-40
241C------------- Chatsworth	0-5	Silty clay-------	CH	A-7	0	100	100	95-100	90-100	50-65	25-35
	5-18	Silty clay, silty clay loam.	CH, CL	A-7	0	100	95-100	95-100	90-100	45-75	20-45
	18-60	Silty clay, silty clay loam.	CL, CH	A-7	0	100	95-100	90-100	85-95	45-65	20-35
294B------------- Symerton	0-11	Silt loam--------	CL	A-7, A-6	0	100	100	95-100	90-100	30-45	10-20
	11-33	Gravelly clay loam, loam, clay loam.	CL	A-7, A-6	0-10	95-100	75-95	75-90	60-90	35-45	15-25
	33-60	Silt loam, silty clay loam, clay loam.	CL	A-7, A-6	0-5	95-100	90-100	85-95	80-95	25-45	15-25
330-------------- Peotone	0-13	Silty clay loam	CH, CL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	13-41	Silty clay loam, silty clay.	CH, CL	A-7	0-5	100	95-100	90-100	85-100	41-70	17-39
	41-60	Silty clay loam, silt loam, silty clay.	CL, CH, ML, MH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	14-29

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
375B------------- Rutland	0-16	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	90-100	30-40	8-15
	16-41	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-55	15-35
	41-60	Silty clay, clay	CH, CL	A-7	0	100	100	95-100	85-100	40-60	20-35
405-------------- Zook	0-25	Silty clay loam	CH, CL	A-7	0	100	100	95-100	95-100	45-65	20-35
	25-60	Silty clay, silty clay loam.	CH	A-7	0	100	100	95-100	95-100	60-85	35-55
440B------------- Jasper	0-15	Loam-------------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	15-20	Loam, fine sandy loam, loam.	CL	A-6	0	100	100	85-95	60-75	20-35	10-20
	20-29	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	100	95-100	80-95	45-85	20-35	10-20
	29-52	Sandy loam, loam, clay loam.	SC, SM-SC	A-4, A-2-4	0	100	85-100	60-70	30-40	20-30	5-10
	52-60	Stratified silt loam to sand.	SC, CL-ML, CL, SM-SC	A-4	0	100	85-100	75-90	35-85	<30	5-10
481A------------- Raub	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	75-95	25-35	5-15
	10-36	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	95-100	80-95	35-55	20-35
	36-45	Clay loam, silty clay loam, silt loam.	CL	A-6, A-7	0	95-100	90-100	85-95	60-85	35-50	15-25
	45-60	Loam, clay loam	CL, ML, SC, SM	A-4, A-6	0-5	85-95	80-90	70-85	40-65	15-30	NP-15
495C3------------ Corwin	0-8	Clay loam--------	CL	A-6	0	90-100	90-100	75-100	50-80	30-40	10-15
	8-37	Clay loam, loam, silt loam.	CL	A-6, A-4	0	90-100	90-100	75-100	50-80	30-40	9-15
	37-60	Loam, silt loam	CL, ML, CL-ML	A-4	0-3	90-95	85-95	75-85	50-75	<25	3-8
805. Orthents											
865*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
23A----------	0-12	22-27	1.35-1.55	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.43	3	6	2-3
Blount	12-33	35-50	1.40-1.70	0.06-0.2	0.12-0.19	4.5-7.3	Moderate-----	0.43			
	33-60	27-38	1.60-1.85	0.06-0.2	0.07-0.10	7.4-8.4	Moderate-----	0.43			
56B----------	0-19	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	5	3-5
Dana	19-29	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	29-49	27-35	1.45-1.65	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.43			
	49-72	15-27	1.55-1.90	0.2-0.6	0.05-0.19	6.6-8.4	Low----------	0.43			
67----------	0-18	27-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
Harpster	18-36	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.28			
	36-41	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.28			
	41-60	15-30	1.40-1.60	0.6-2.0	0.11-0.22	7.4-8.4	Low----------	0.28			
69----------	0-16	35-40	1.30-1.50	0.6-2.0	0.12-0.23	5.6-7.3	High---------	0.28	5	4	5-6
Milford	16-52	35-42	1.40-1.65	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	52-60	20-30	1.50-1.70	0.2-0.6	0.20-0.22	6.6-8.4	Moderate-----	0.43			
91A----------	0-9	27-40	1.25-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.37	3	7	3-5
Swygert	9-18	30-45	1.30-1.55	0.2-0.6	0.08-0.16	5.6-7.3	High---------	0.28			
	18-48	45-50	1.40-1.70	0.06-0.2	0.05-0.12	5.6-8.4	High---------	0.28			
	48-60	38-60	1.40-1.75	<0.06	0.03-0.05	7.4-8.4	High---------	0.28			
91B2----------	0-6	27-40	1.25-1.50	0.2-0.6	0.18-0.22	5.6-7.3	Moderate-----	0.37	3	7	2-3
Swygert	6-37	45-50	1.40-1.70	0.06-0.2	0.05-0.12	5.6-8.4	High---------	0.28			
	37-60	38-60	1.40-1.75	<0.06	0.03-0.05	7.4-8.4	High---------	0.28			
102----------	0-16	10-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.3	Low----------	0.28	5	5	3-4
La Hogue	16-32	20-35	1.50-1.70	0.6-2.0	0.12-0.20	5.1-7.3	Moderate-----	0.28			
	32-39	10-20	1.55-1.75	0.6-2.0	0.08-0.20	6.1-7.3	Low----------	0.20			
	39-60	5-20	1.60-1.80	0.6-2.0	0.05-0.22	5.6-7.8	Low----------	0.20			
103----------	0-60	---	0.15-0.45	0.2-6.0	0.35-0.45	5.6-7.8	-------------	----	2	2	>70
Houghton											
107----------	0-14	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
Sawmill	14-29	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	29-48	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	48-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
125----------	0-21	20-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low----------	0.28	5	6	4-6
Selma	21-46	18-30	1.40-1.60	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
	46-60	7-18	1.60-1.90	2.0-6.0	0.07-0.19	6.6-8.4	Low----------	0.28			
134A----------	0-13	14-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-2
Camden	13-38	22-35	1.35-1.55	0.6-2.0	0.16-0.20	5.1-7.3	Moderate-----	0.37			
	38-56	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.6-7.3	Low----------	0.37			
	56-60	5-20	1.55-1.75	0.6-6.0	0.11-0.22	5.6-8.4	Low----------	0.37			
146A----------	0-8	24-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	4	6	4-5
Elliott	8-38	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28			
	38-60	25-40	1.60-1.75	0.06-0.2	0.14-0.20	7.4-8.4	Moderate-----	0.28			
146B2----------	0-6	24-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	4	6	2-3
Elliott	6-26	35-50	1.30-1.60	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.28			
	26-60	25-40	1.60-1.75	0.06-0.2	0.14-0.20	7.4-8.4	Moderate-----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
147A----------- Clarence	0-11	27-40	1.45-1.65	0.2-0.6	0.21-0.24	5.6-7.3	Moderate-----	0.37	3	6	3-5
	11-34	50-60	1.60-1.75	<0.06	0.07-0.09	5.6-8.4	Moderate-----	0.28			
	34-60	40-60	1.70-1.85	<0.06	0.05-0.07	7.4-8.4	Moderate-----	0.28			
147B2----------- Clarence	0-9	40-55	1.40-1.60	0.06-0.2	0.12-0.14	5.6-7.3	Moderate-----	0.28	3	4	2-3
	9-26	50-60	1.60-1.75	<0.06	0.07-0.09	5.6-8.4	Moderate-----	0.28			
	26-60	40-60	1.70-1.85	<0.06	0.05-0.07	7.4-8.4	Moderate-----	0.28			
148B----------- Proctor	0-15	18-25	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low----------	0.32	5-4	6	3-4
	15-33	27-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	33-41	22-35	1.20-1.45	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.43			
	41-60	10-32	1.40-1.70	2.0-6.0	0.07-0.19	6.1-7.8	Low----------	0.43			
149----------- Brenton	0-14	20-27	1.25-1.50	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	4-5
	14-34	25-35	1.30-1.55	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.28			
	34-48	20-30	1.40-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.28			
	48-60	15-27	1.50-1.70	0.6-2.0	0.11-0.20	5.6-8.4	Low----------	0.28			
150B----------- Onarga	0-10	8-15	1.15-1.45	0.6-2.0	0.13-0.22	5.6-7.8	Low----------	0.20	4	3	2-4
	10-29	15-18	1.45-1.70	0.6-2.0	0.15-0.19	4.5-7.3	Low----------	0.20			
	29-60	2-10	1.65-1.90	6.0-20	0.05-0.13	5.1-7.3	Low----------	0.15			
151----------- Ridgeville	0-12	10-15	1.15-1.45	0.6-2.0	0.15-0.22	5.6-6.5	Low----------	0.20	4	3	2-4
	12-25	14-18	1.45-1.70	0.6-2.0	0.15-0.19	5.6-6.5	Low----------	0.20			
	25-60	3-10	1.55-1.90	2.0-6.0	0.05-0.13	5.6-7.8	Low----------	0.20			
152----------- Drummer	0-16	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.8	Moderate-----	0.28	5	7	5-7
	16-44	20-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28			
	44-55	22-33	1.30-1.55	0.6-2.0	0.17-0.20	6.1-8.4	Moderate-----	0.28			
	55-60	15-32	1.40-1.70	0.6-2.0	0.11-0.19	6.6-8.4	Low----------	0.28			
153----------- Pella	0-12	27-35	1.10-1.30	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	5-6
	12-33	27-35	1.20-1.45	0.6-2.0	0.21-0.24	6.6-7.8	Moderate-----	0.28			
	33-42	15-27	1.35-1.60	0.6-2.0	0.15-0.20	7.4-8.4	Moderate-----	0.28			
	42-60	15-30	1.40-1.70	0.6-2.0	0.10-0.22	7.4-8.4	Low----------	0.28			
189----------- Martinton	0-10	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	4-5
	10-51	35-45	1.25-1.45	0.2-0.6	0.11-0.20	5.6-7.8	Moderate-----	0.43			
	51-60	15-42	1.40-1.60	0.2-0.6	0.11-0.22	7.4-8.4	Moderate-----	0.43			
192----------- Del Rey	0-14	15-27	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	3	6	2-3
	14-52	35-45	1.40-1.65	0.06-0.2	0.12-0.20	4.5-8.4	Moderate-----	0.43			
	52-60	25-45	1.50-1.70	0.06-0.2	0.09-0.11	7.4-8.4	Moderate-----	0.43			
194B----------- Morley	0-11	22-27	1.35-1.55	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.43	3	6	2-3
	11-16	27-40	1.45-1.65	0.2-0.6	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	16-29	35-50	1.55-1.70	0.2-0.6	0.11-0.15	5.6-7.8	Moderate-----	0.43			
	29-40	27-50	1.60-1.80	0.06-0.6	0.07-0.12	6.1-8.4	Moderate-----	0.43			
	40-60	27-40	1.60-1.80	0.06-0.6	0.07-0.12	6.1-8.4	Moderate-----	0.43			
223B2----------- Varna	0-12	20-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	4	6	2-3
	12-27	35-48	1.30-1.60	0.06-0.6	0.09-0.19	5.6-7.3	Moderate-----	0.32			
	27-60	27-40	1.50-1.70	0.2-0.6	0.14-0.20	6.6-8.4	Low----------	0.32			
230----------- Rowe	0-14	30-40	1.25-1.45	0.06-0.2	0.14-0.20	5.1-7.8	Moderate-----	0.28	5	4	3-5
	14-52	48-60	1.40-1.70	<0.06	0.09-0.13	6.1-8.4	High---------	0.28			
	52-60	40-50	1.40-1.75	<0.06	0.08-0.12	7.4-8.4	Moderate-----	0.28			
232----------- Ashkum	0-15	35-40	1.20-1.40	0.2-0.6	0.12-0.23	5.6-7.8	High---------	0.28	5	4	5-7
	15-41	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High---------	0.28			
	41-60	30-40	1.60-1.75	0.2-0.6	0.18-0.20	6.1-8.4	Moderate-----	0.28			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
235-------------- Bryce	0-12	35-40	1.30-1.50	0.2-0.6	0.12-0.21	5.6-7.8	High---------	0.28	5	4	5-7
	12-43	42-52	1.35-1.60	0.06-0.2	0.09-0.13	6.6-8.4	High---------	0.28			
	43-60	38-60	1.60-1.75	0.06-0.2	0.03-0.05	7.4-8.4	High---------	0.28			
238-------------- Rantoul	0-13	40-45	1.35-1.55	0.2-0.6	0.12-0.23	6.1-7.3	High---------	0.28	3	4	5-7
	13-38	42-60	1.45-1.65	<0.06	0.09-0.13	6.1-8.4	High---------	0.28			
	38-60	35-45	1.50-1.70	<0.06	0.08-0.20	7.4-8.4	High---------	0.28			
241C------------- Chatsworth	0-5	40-60	1.30-1.50	<0.06	0.06-0.07	5.6-8.4	Moderate-----	0.32	2	4	.5-1
	5-18	35-60	1.50-1.70	<0.06	0.05-0.07	6.1-8.4	Moderate-----	0.32			
	18-60	35-50	1.60-1.85	<0.06	0.04-0.06	7.4-8.4	Moderate-----	0.32			
294B------------- Symerton	0-11	20-27	1.15-1.30	0.6-2.0	0.21-0.24	5.6-7.3	Low----------	0.32	4	6	3-4
	11-33	25-35	1.35-1.60	0.6-2.0	0.12-0.18	5.6-7.8	Moderate-----	0.32			
	33-60	20-35	1.45-1.70	0.2-0.6	0.09-0.10	6.6-8.4	Moderate-----	0.43			
330-------------- Peotone	0-13	33-40	1.20-1.40	0.2-0.6	0.12-0.23	5.6-7.8	High---------	0.28	5	4	5-7
	13-41	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High---------	0.28			
	41-60	25-42	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High---------	0.28			
375B------------- Rutland	0-16	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
	16-41	35-45	1.35-1.55	0.2-0.6	0.18-0.20	5.1-8.4	High---------	0.43			
	41-60	40-50	1.45-1.70	0.06-0.2	0.08-0.12	6.6-8.4	High---------	0.32			
405-------------- Zook	0-25	32-38	1.30-1.35	0.2-0.6	0.21-0.23	5.6-7.3	High---------	0.28	5	7	5-7
	25-60	36-45	1.30-1.45	0.06-0.2	0.11-0.13	5.6-7.8	High---------	0.28			
440B------------- Jasper	0-15	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.28	5	5	3-5
	15-20	18-25	1.35-1.50	0.6-2.0	0.17-0.19	5.1-6.5	Low----------	0.28			
	20-29	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-7.3	Low----------	0.28			
	29-52	12-30	1.40-1.60	0.6-2.0	0.14-0.16	5.6-7.8	Low----------	0.28			
	52-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	6.6-8.4	Low----------	0.28			
481A------------- Raub	0-10	20-27	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	5	2-4
	10-36	25-35	1.50-1.70	0.2-0.6	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	36-45	25-35	1.50-1.70	0.2-0.6	0.15-0.19	6.6-7.8	Moderate-----	0.37			
	45-60	20-32	1.50-1.70	0.2-0.6	0.05-0.19	7.4-8.4	Low----------	0.37			
495C3------------ Corwin	0-8	27-35	1.40-1.60	0.6-2.0	0.17-0.19	5.1-7.3	Moderate-----	0.28	5	6	.5-3
	8-37	25-35	1.40-1.60	0.6-2.0	0.15-0.19	5.1-7.8	Moderate-----	0.28			
	37-60	10-20	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Low----------	0.37			
805. Orthents											
865*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
23A-----------------Blount	C	None---------	---	---	1.0-3.0	Perched	Jan-May	High-----	High-----	High.
56B-----------------Dana	B	None---------	---	---	3.0-6.0	Perched	Mar-Apr	High-----	Moderate	Moderate.
67------------------Harpster	B/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	High-----	High-----	Low.
69------------------Milford	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
91A, 91B2-----------Swygert	C	None---------	---	---	2.0-4.0	Perched	Feb-May	High-----	High-----	Low.
102-----------------La Hogue	B	None---------	---	---	1.0-3.0	Apparent	Feb-Jun	High-----	High-----	Moderate.
103-----------------Houghton	A/D	None---------	---	---	+1-1.0	Apparent	Sep-Jun	High-----	High-----	Low.
107-----------------Sawmill	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
125-----------------Selma	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Low.
134A----------------Camden	B	None---------	---	---	>6.0	---	---	High-----	Low------	Moderate.
146A, 146B2---------Elliott	C	None---------	---	---	1.0-3.0	Apparent	Mar-May	High-----	High-----	Moderate.
147A, 147B2---------Clarence	D	None---------	---	---	1.0-3.0	Perched	Feb-May	Moderate	High-----	Low.
148B----------------Proctor	B	None---------	---	---	>6.0	---	---	High-----	Moderate	Moderate.
149-----------------Brenton	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
150B----------------Onarga	B	None---------	---	---	>6.0	---	---	Moderate	Low------	High.
151-----------------Ridgeville	B	None---------	---	---	1.0-3.0	Apparent	Feb-May	High-----	Moderate	Moderate.
152-----------------Drummer	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High-----	High-----	Moderate.
153-----------------Pella	B/D	None---------	---	---	+.5-2.0	Apparent	Dec-Jun	High-----	High-----	Low.
189-----------------Martinton	C	None---------	---	---	1.0-3.0	Apparent	Feb-May	High-----	High-----	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
192----------------- Del Rey	C	None--------	---	---	1.0-3.0	Apparent	Jan-May	High-----	High-----	Moderate.
194B---------------- Morley	C	None--------	---	---	3.0-6.0	Perched	Mar-May	Moderate	High-----	Moderate.
223B2--------------- Varna	C	None--------	---	---	3.0-6.0	Perched	Mar-May	High-----	Moderate	Moderate.
230----------------- Rowe	D	None--------	---	---	+.5-1.0	Apparent	Mar-Jun	Moderate	High-----	Low.
232----------------- Ashkum	B/D	None--------	---	---	+1-2.0	Apparent	Apr-Jun	High-----	High-----	Moderate.
235----------------- Bryce	D	None--------	---	---	+1-1.0	Apparent	Feb-Jun	High-----	High-----	Low.
238----------------- Rantoul	D	None--------	---	---	+.5-2.0	Perched	Mar-Jun	Moderate	High-----	Low.
241C---------------- Chatsworth	D	None--------	---	---	>6.0	---	---	Moderate	High-----	Low.
294B---------------- Symerton	B	None--------	---	---	3.5-6.0	Apparent	Mar-May	Moderate	High-----	Moderate.
330----------------- Peotone	B/D	None--------	---	---	+.5-1.0	Apparent	Feb-Jul	High-----	High-----	Moderate.
375B---------------- Rutland	C	None--------	---	---	1.0-3.0	Apparent	Mar-May	High-----	High-----	Moderate.
405----------------- Zook	C/D	Frequent----	Brief-----	Feb-Nov	0-3.0	Apparent	Nov-May	High-----	High-----	Moderate.
440B---------------- Jasper	B	None--------	---	---	>6.0	---	---	Moderate	Moderate	High.
481A---------------- Raub	C	None--------	---	---	1.0-3.0	Apparent	Jan-Apr	High-----	High-----	Moderate.
495C3--------------- Corwin	B	None--------	---	---	2.0-4.0	Apparent	Jan-Apr	Moderate	High-----	Moderate.
805. Orthents										
865*. Pits										

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

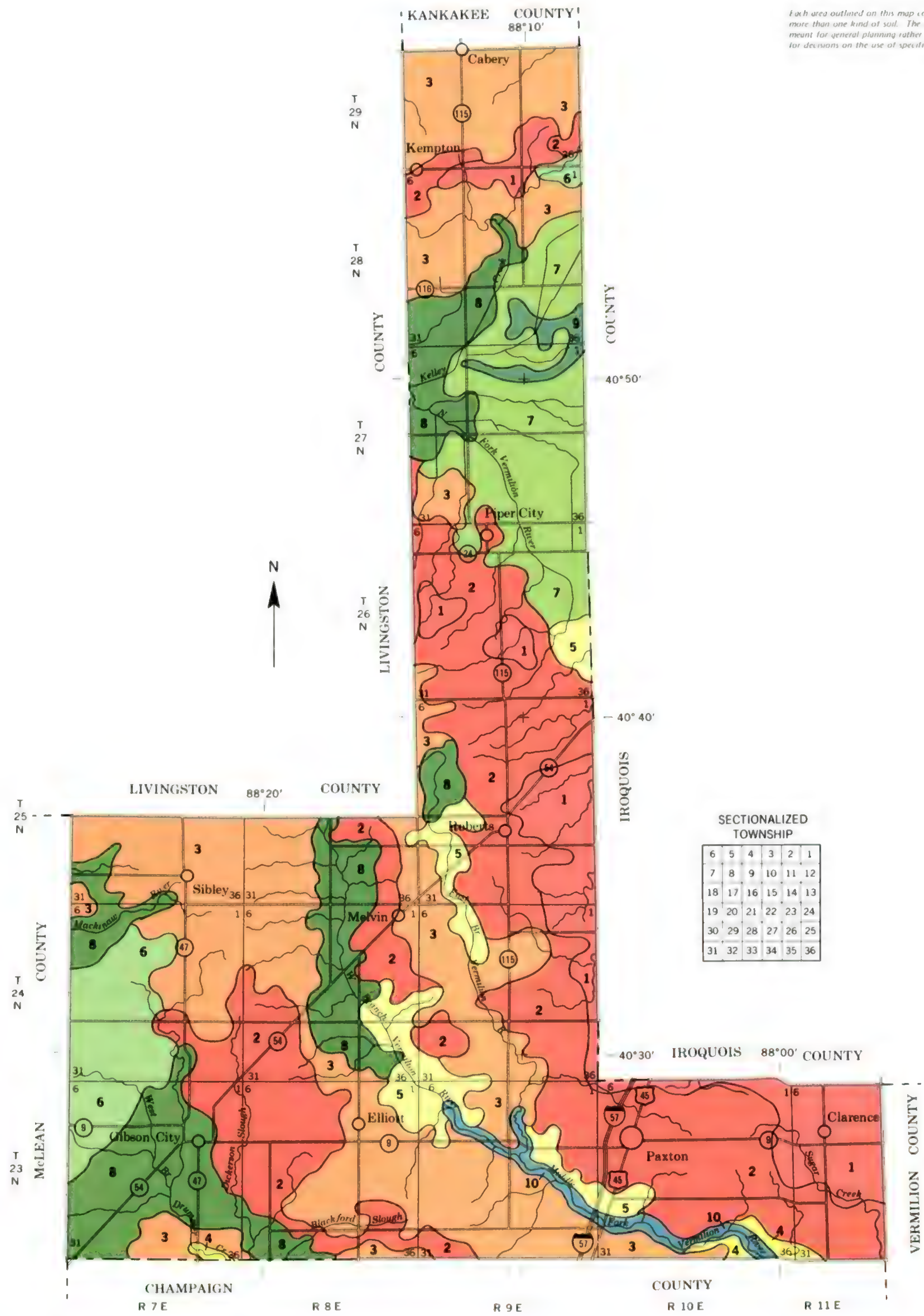
(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Ashkum	Fine, mixed, mesic Typic Haplaquolls
Blount	Fine, illitic, mesic Aeric Ochraqualfs
Brenton	Fine-silty, mixed, mesic Aquic Argiudolls
Bryce	Fine, mixed, mesic Typic Haplaquolls
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Chatsworth	Fine, illitic, mesic Typic Eutrochrepts
Clarence	Fine, illitic, mesic Aquic Argiudolls
*Corwin	Fine-loamy, mixed, mesic Typic Argiudolls
Dana	Fine-silty, mixed, mesic Typic Argiudolls
Del Rey	Fine, illitic, mesic Aeric Ochraqualfs
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Elliott	Fine, illitic, mesic Aquic Argiudolls
Harpster	Fine-silty, mesic Typic Calciaquolls
Houghton	Euic, mesic Typic Medisaprists
Jasper	Fine-loamy, mixed, mesic Typic Argiudolls
La Hogue	Fine-loamy, mixed, mesic Aquic Argiudolls
Martinton	Fine, illitic, mesic Aquic Argiudolls
Milford	Fine, mixed, mesic Typic Haplaquolls
Morley	Fine, illitic, mesic Typic Hapludalfs
Onarga	Coarse-loamy, mixed, mesic Typic Argiudolls
Orthents	Fine, mesic Udorthents
Pella	Fine-silty, mixed, mesic Typic Haplaquolls
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Rantoul	Fine, montmorillonitic, mesic Vertic Haplaquolls
Raub	Fine-silty, mixed, mesic Aquic Argiudolls
Ridgeville	Coarse-loamy, mixed, mesic Aquic Argiudolls
Rowe	Fine, mixed, mesic Typic Argiaquolls
Rutland	Fine, montmorillonitic, mesic Aquic Argiudolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
Swygert	Fine, mixed, mesic Aquic Argiudolls
Symerton	Fine-loamy, mixed, mesic Typic Argiudolls
Varna	Fine, illitic, mesic Typic Argiudolls
Zook	Fine, montmorillonitic, mesic Cumulic Haplaquolls

U.S. Government Printing Office: 1990-262-945/20004

NRCS Accessibility Statement

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts



LEGEND*

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT HAVE VERY SLOW OR SLOW PERMEABILITY; ON TILL PLAINS AND MORAINES

1 ROWE-CLARENCE association: Poorly drained and somewhat poorly drained, silty and clayey soils formed in a thin layer of loess or local wash and in the underlying glacial till

2 BRYCE-SWYGERT association: Poorly drained and somewhat poorly drained, silty soils formed in loess and lacustrine sediments or local wash and in the underlying glacial till

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT HAVE MODERATELY SLOW OR SLOW PERMEABILITY; ON TILL PLAINS, LAKE PLAINS, AND MORAINES

3 ELLIOTT-ASHKUM association: Somewhat poorly drained and poorly drained, silty soils formed in loess or local wash and in the underlying glacial till

4 BLOUNT-MORLEY association: Somewhat poorly drained and moderately well drained, silty soils formed in loess and in the underlying glacial till

5 MILFORD-MARTINTON-DEL REY association: Poorly drained and somewhat poorly drained, silty soils formed in lacustrine sediments

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT HAVE MODERATE OR MODERATELY SLOW PERMEABILITY; ON TILL PLAINS AND MORAINES

6 DRUMMER-DANA-RAUB association. Poorly drained to moderately well drained, silty soils formed in loess and in the underlying glacial till or glacial outwash

NEARLY LEVEL SOILS THAT HAVE MODERATE OR MODERATELY SLOW PERMEABILITY; ON LAKE PLAINS AND OUTWASH PLAINS

7 PELLA-MILFORD association: Poorly drained, silty soils formed in lacustrine sediments and in the underlying glacial outwash

8 DRUMMER-BRENTON association: Poorly drained and somewhat poorly drained, silty soils formed in loess and in the underlying glacial outwash

NEARLY LEVEL AND GENTLY SLOPING SOILS THAT HAVE MODERATE PERMEABILITY IN THE SUBSOIL AND MODERATELY RAPID OR RAPID PERMEABILITY IN THE SUBSTRATUM, ON OUTWASH RIDGES

9 SELMA-RIDGEVILLE-ONARGA association: Poorly drained, somewhat poorly drained, and well drained, loamy soils formed in glacial outwash

NEARLY LEVEL SOILS THAT HAVE MODERATE OR SLOW PERMEABILITY; ON FLOOD PLAINS

10 SAWMILL-ZOOK association Poorly drained, silty soils formed in alluvium

*The texture given in the descriptive heading of each association refers to the texture of the surface layer of the major soils in that association

COMPILED 1988

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

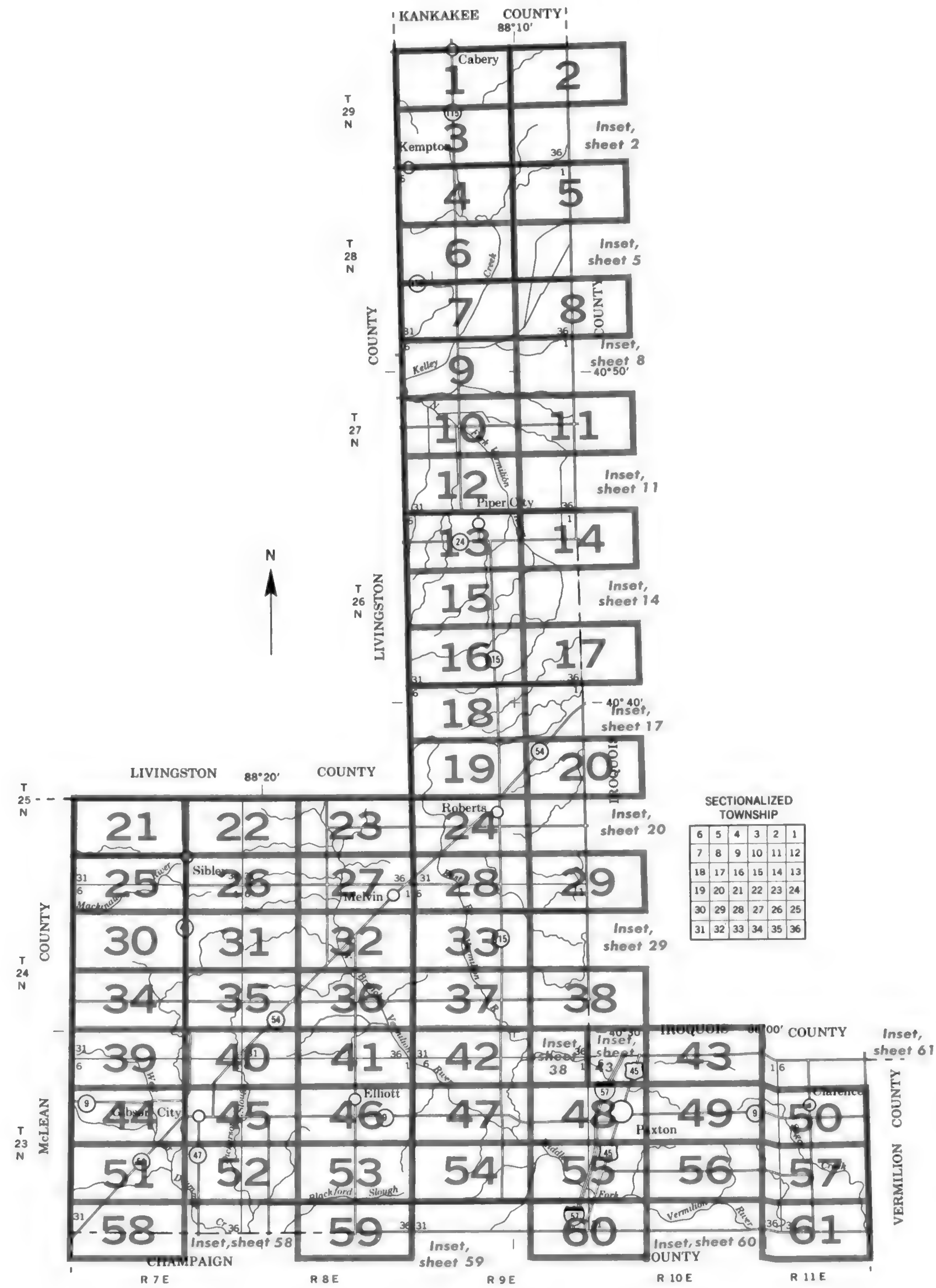
GENERAL SOIL MAP

FORD COUNTY, ILLINOIS

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

INDEX TO MAP SHEETS

FORD COUNTY, ILLINOIS

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is moderately eroded, and 3 that it is severely eroded.

SYMBOL	NAME
23A	Blount silt loam, 0 to 3 percent slopes
56B	Dana silt loam, 1 to 5 percent slopes
67	Harpster silty clay loam
69	Milford silty clay loam
91A	Swygert silty clay loam, 0 to 2 percent slopes
91B2	Swygert silty clay loam, 2 to 5 percent slopes, eroded
102	La Hogue loam
103	Houghton muck
107	Sawmill silty clay loam
125	[redacted]
134A	Camden silt loam, 0 to 3 percent slopes
146A	Elliott silt loam, 0 to 2 percent slopes
146B2	Elliott silt loam, 2 to 5 percent slopes, eroded
147A	Clarence silty clay loam, 0 to 2 percent slopes
147B2	Clarence silty clay, 2 to 5 percent slopes, eroded
148B	Proctor silt loam, 1 to 5 percent slopes
149	Brenton silt loam
150B	Onarga fine sandy loam, 1 to 5 percent slopes
151	Ridgeville fine sandy loam
152	Drummer silty clay loam
153	Pella silty clay loam
189	Martinton silt loam
192	Del Rey silt loam
194B	Morley silt loam, 1 to 5 percent slopes
223B2	Varna silt loam, 1 to 5 percent slopes, eroded
230	Rowe silty clay loam
232	Ashkum silty clay loam
235	Bryce silty clay loam
238	Rantoul silty clay
241C	Chatsworth silty clay, 4 to 10 percent slopes
294B	Symerton silt loam, 1 to 5 percent slopes
330	Peotone silty clay loam
375B	Rutland silt loam, 1 to 5 percent slopes
405	Zook silty clay loam
440B	Jasper loam, 1 to 5 percent slopes
481A	Raub silt loam, 0 to 3 percent slopes
495C3	Corwin clay loam, 5 to 10 percent slopes, severely eroded
805	Orthents, clayey
865	Pits, gravel

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

County or parish

Field sheet matchline & neatline

AD HOC BOUNDARY (label)

Small airport, airfield, park, oilfield, cemetery — Davis Airstrip

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections)

ROADS

Divided (median shown if scale permits)

Other roads

ROAD EMBLEMS & DESIGNATIONS

Interstate

Federal

State

RAILROAD

DAMS

Medium or small

PITS

Gravel pit

WATER FEATURES

DRAINAGE

Perennial, single line

Intermittent

Drainage end

Canals or ditches

Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

Perennial

Intermittent

MISCELLANEOUS WATER FEATURES

Marsh or swamp

Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 223B2 146A

ESCARPMENTS

Other than bedrock (points down slope)

SHORT STEEP SLOPE

DEPRESSION OR SINK

SOIL SAMPLE SITE

MISCELLANEOUS

Gravelly spot

Dumps and other similar non soil areas

Sandy spot

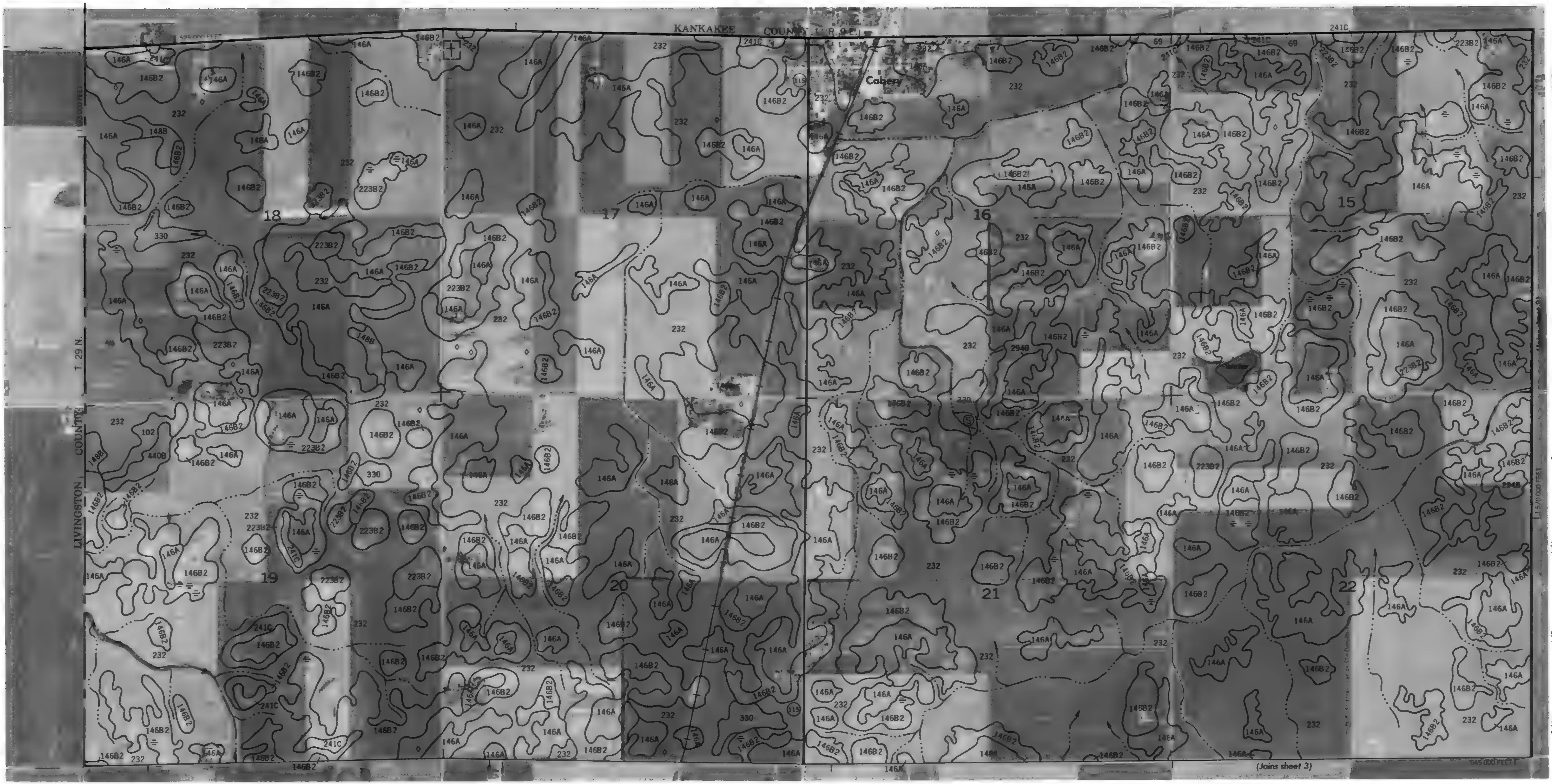
Severely eroded spot

Muck spot

Calcareous spot

Gray spot

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 1



FORD COUNTY, ILLINOIS NO. 1

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

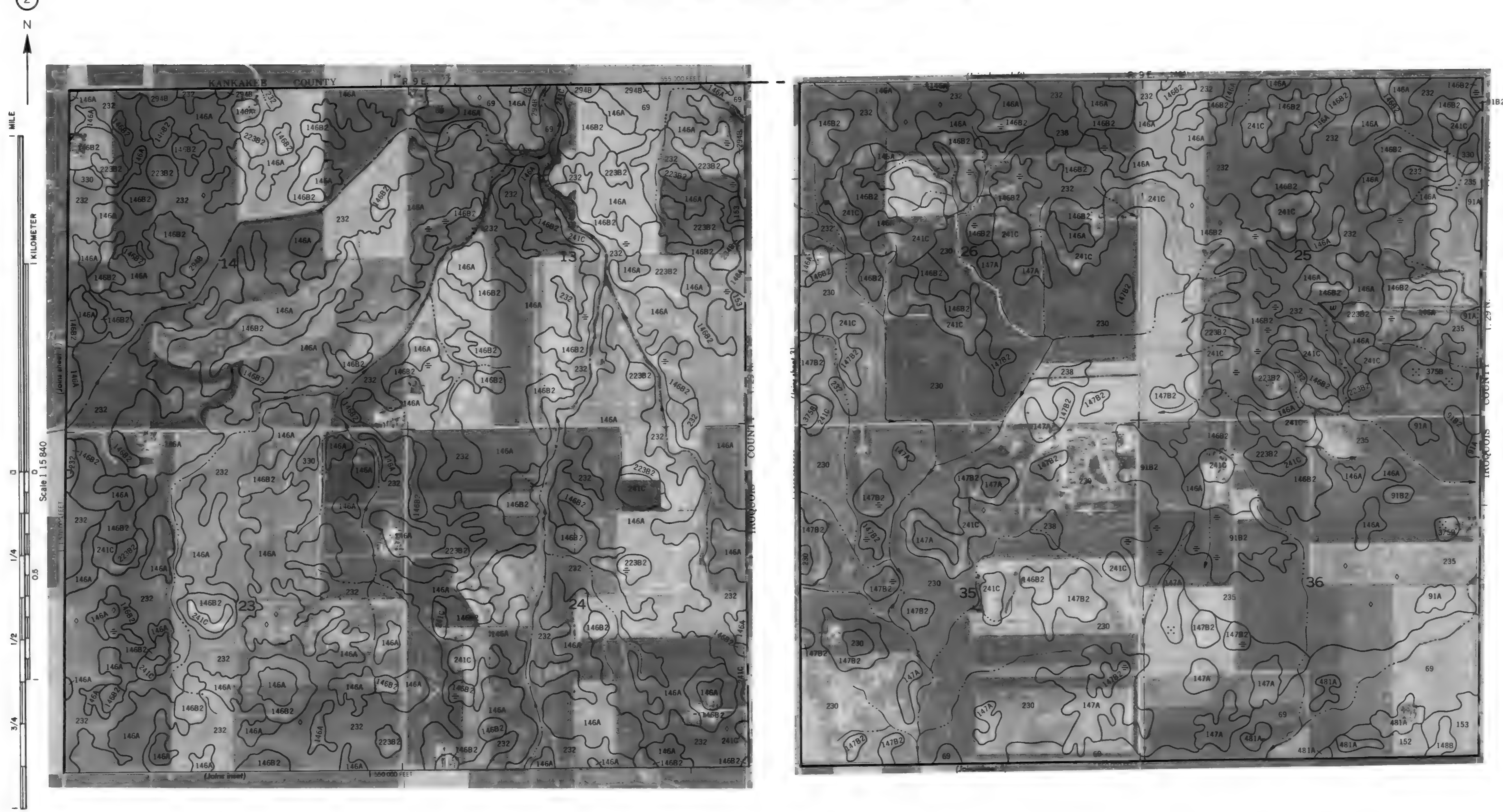
1

N

1 MILE

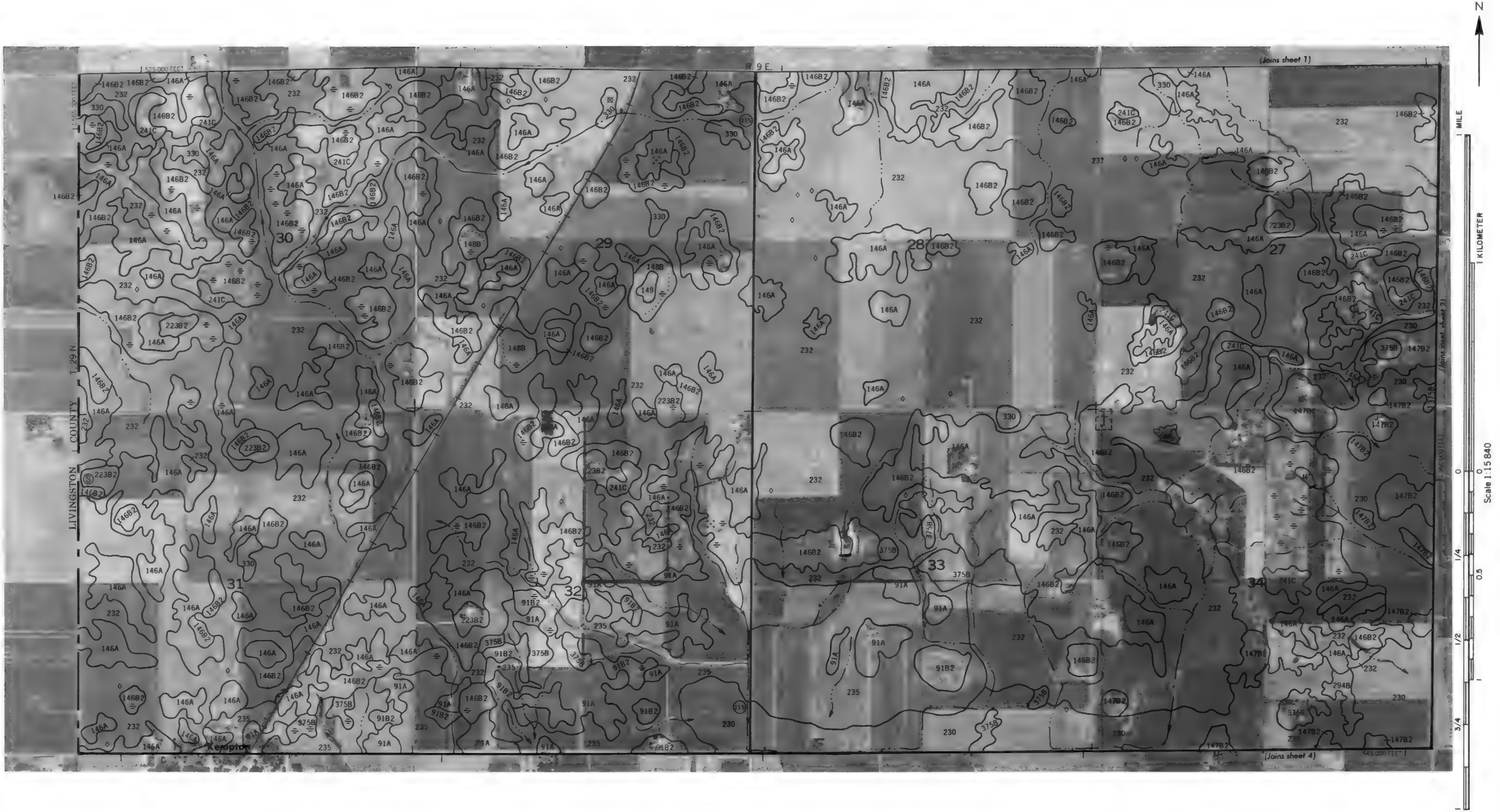
1 KILOMETER

Scale 1:15 840



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

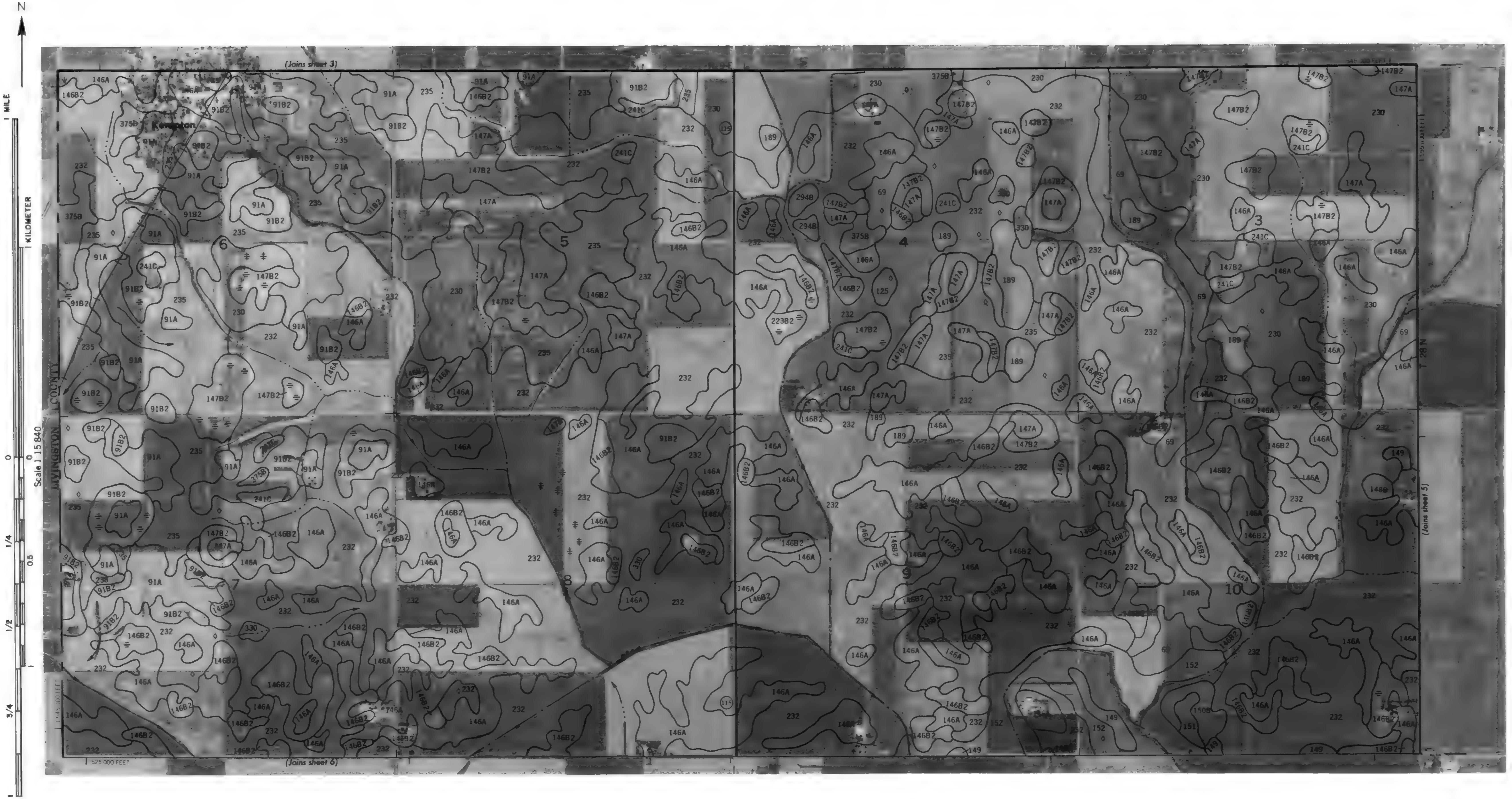
SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 3



FORD COUNTY, ILLINOIS NO. 3

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 4



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

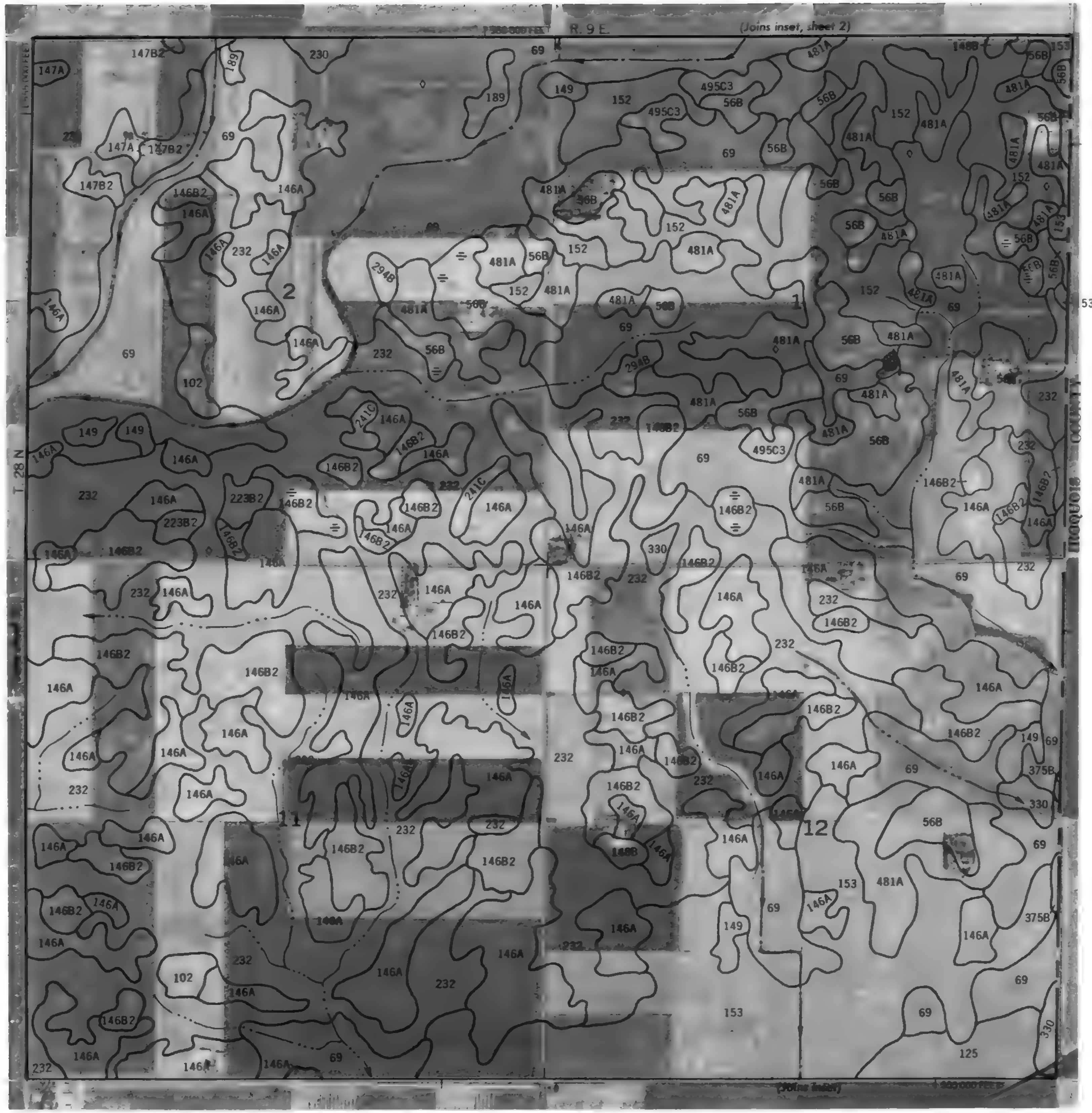
FORD COUNTY, ILLINOIS NO. 4

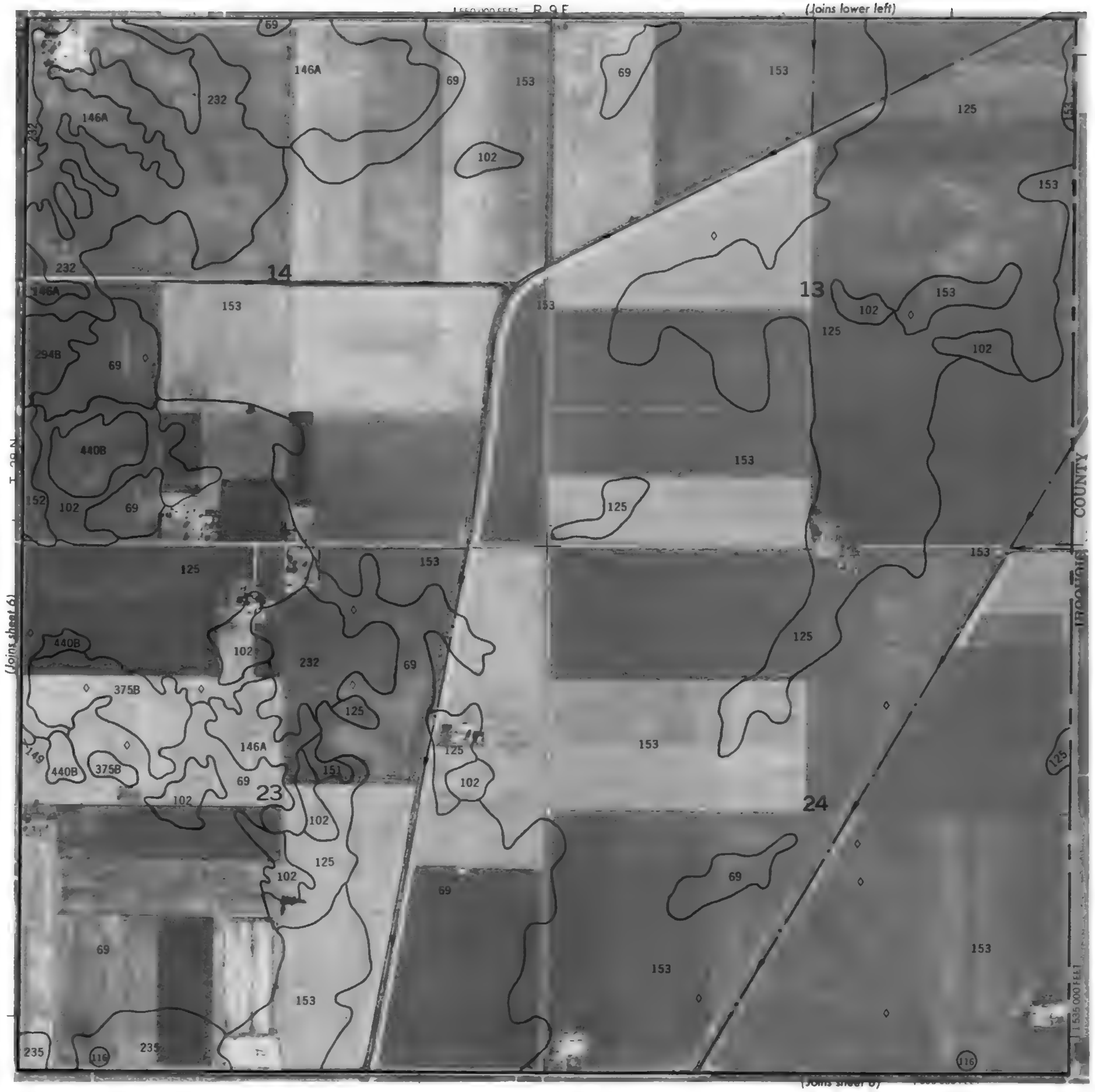
5

N

FORD COUNTY, ILLINOIS NO. 5

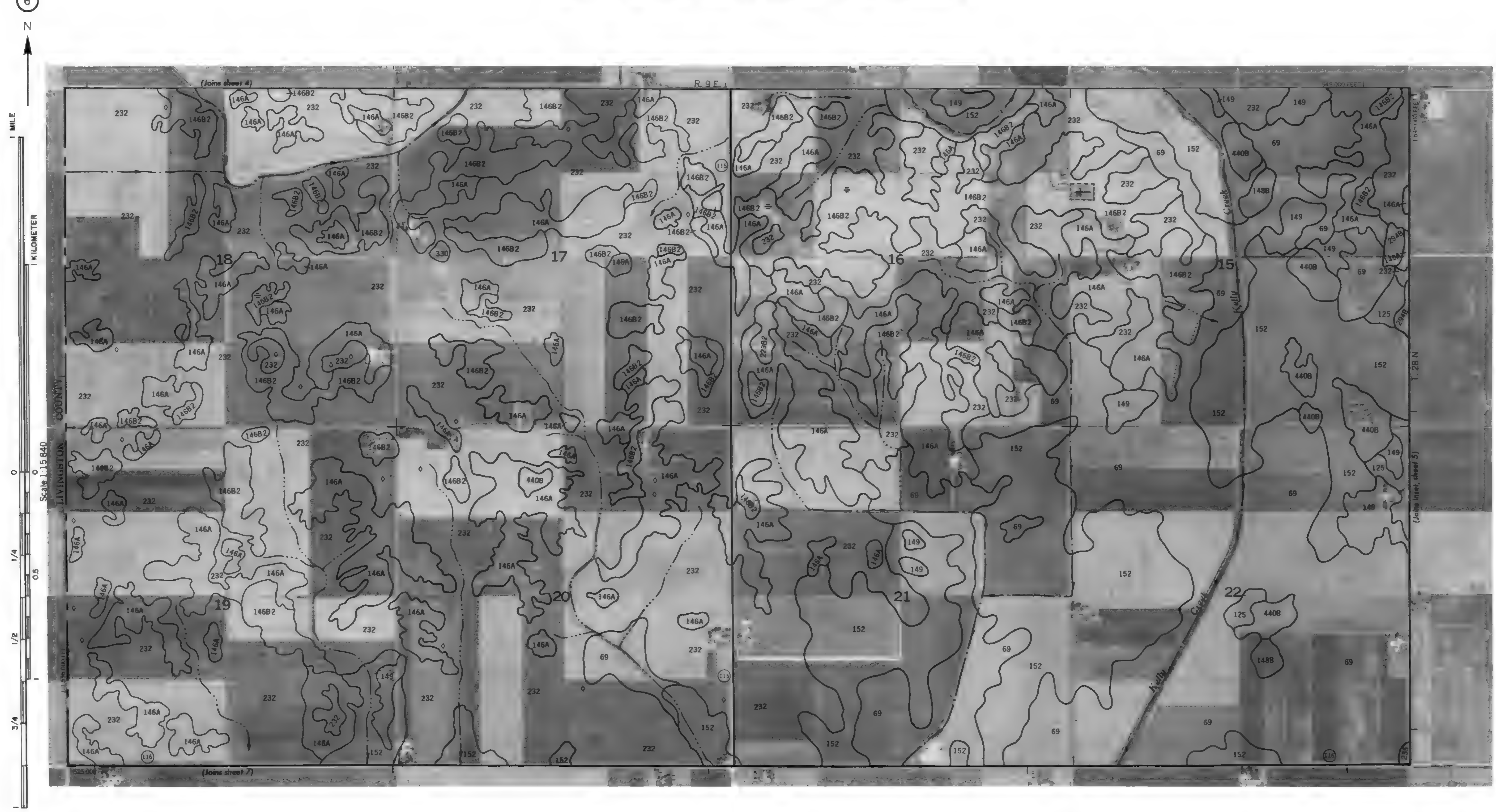
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



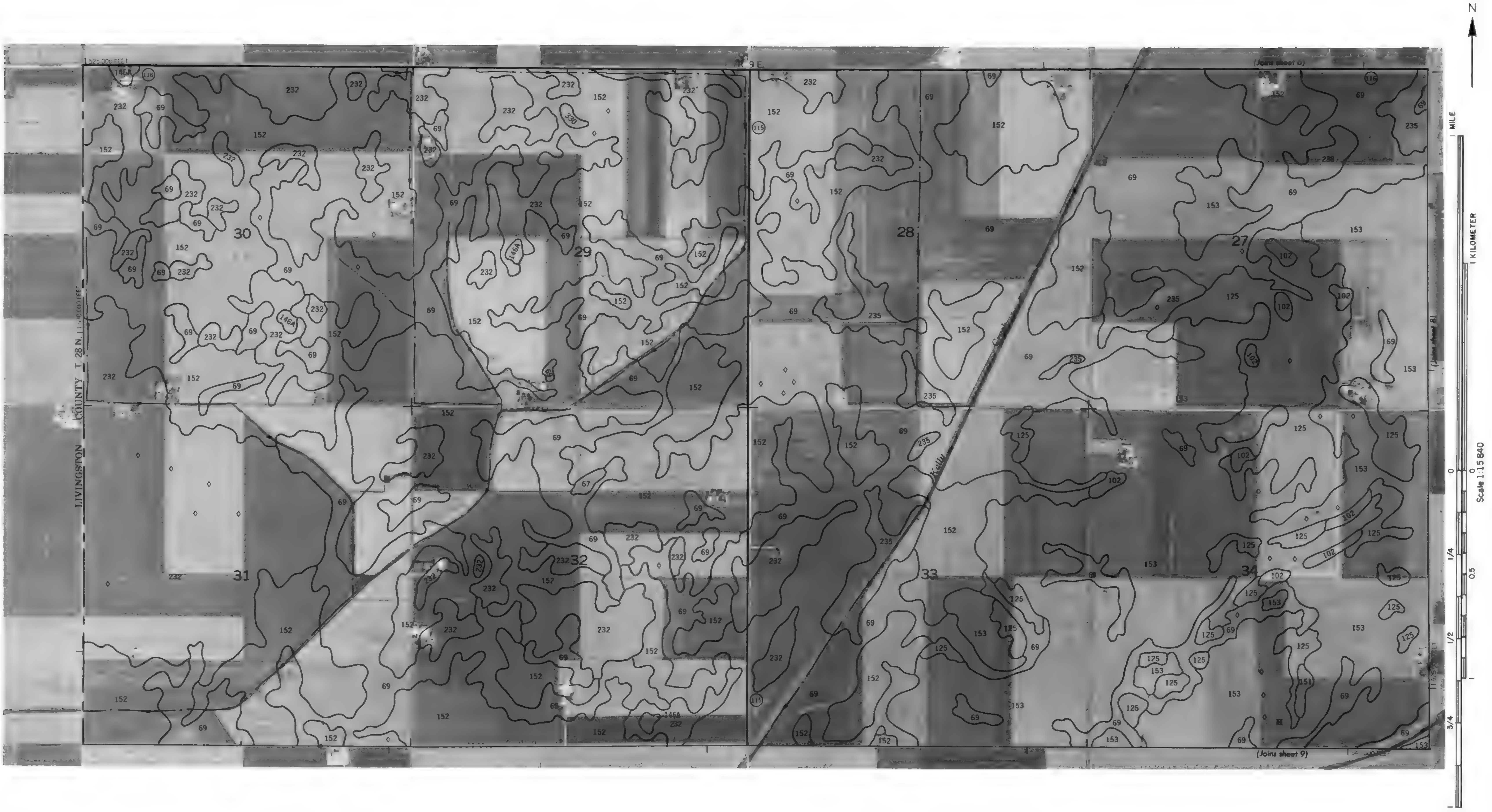


1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0
0.5

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 6



FORD COUNTY, ILLINOIS NO. 6



FORD COUNTY, ILLINOIS NO. 7

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

8

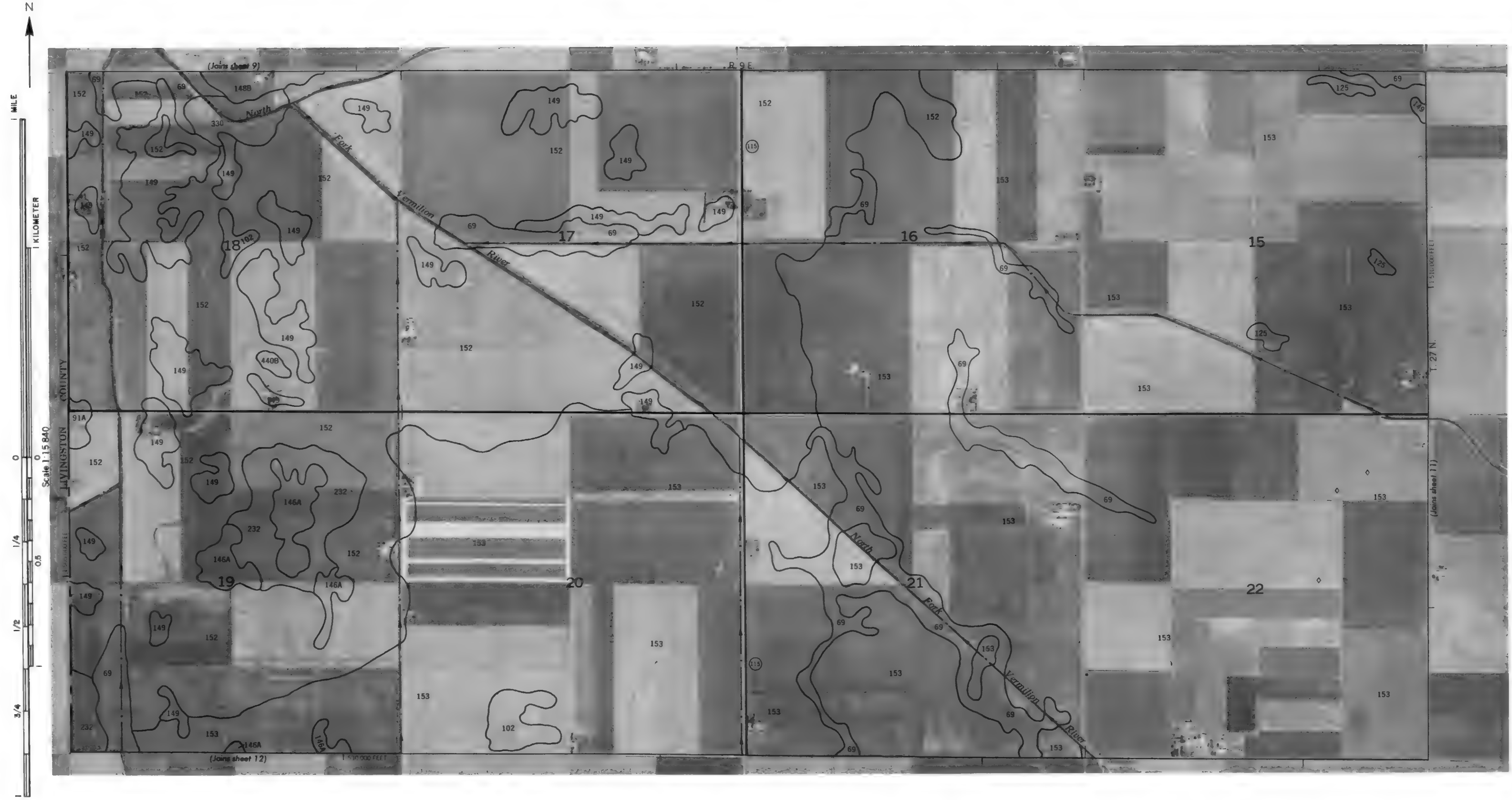
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 9

FORD COUNTY, ILLINOIS NO. 9

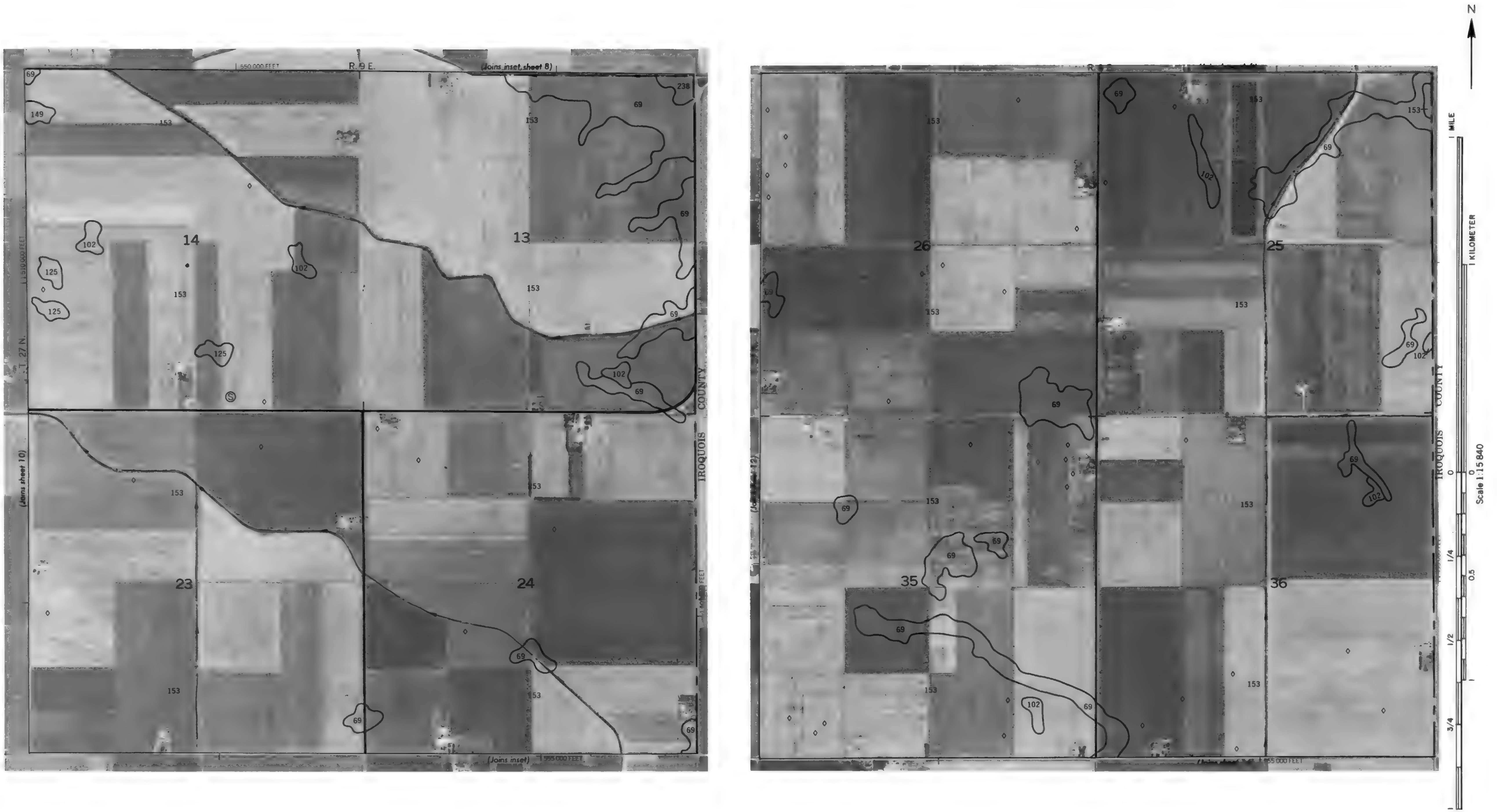
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 10



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

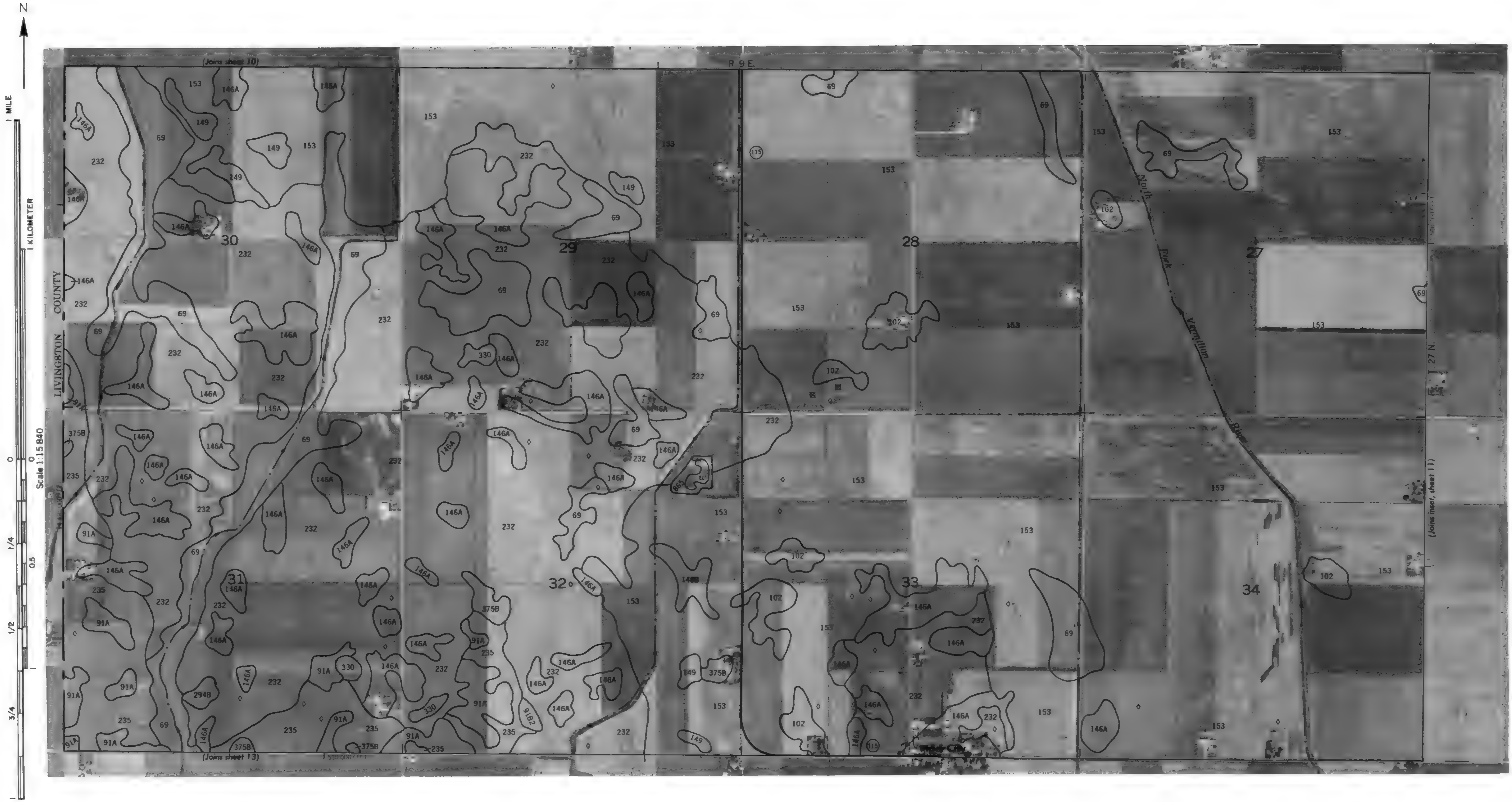
SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 11



FORD COUNTY, ILLINOIS NO. 11

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 12



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 13

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 MILE

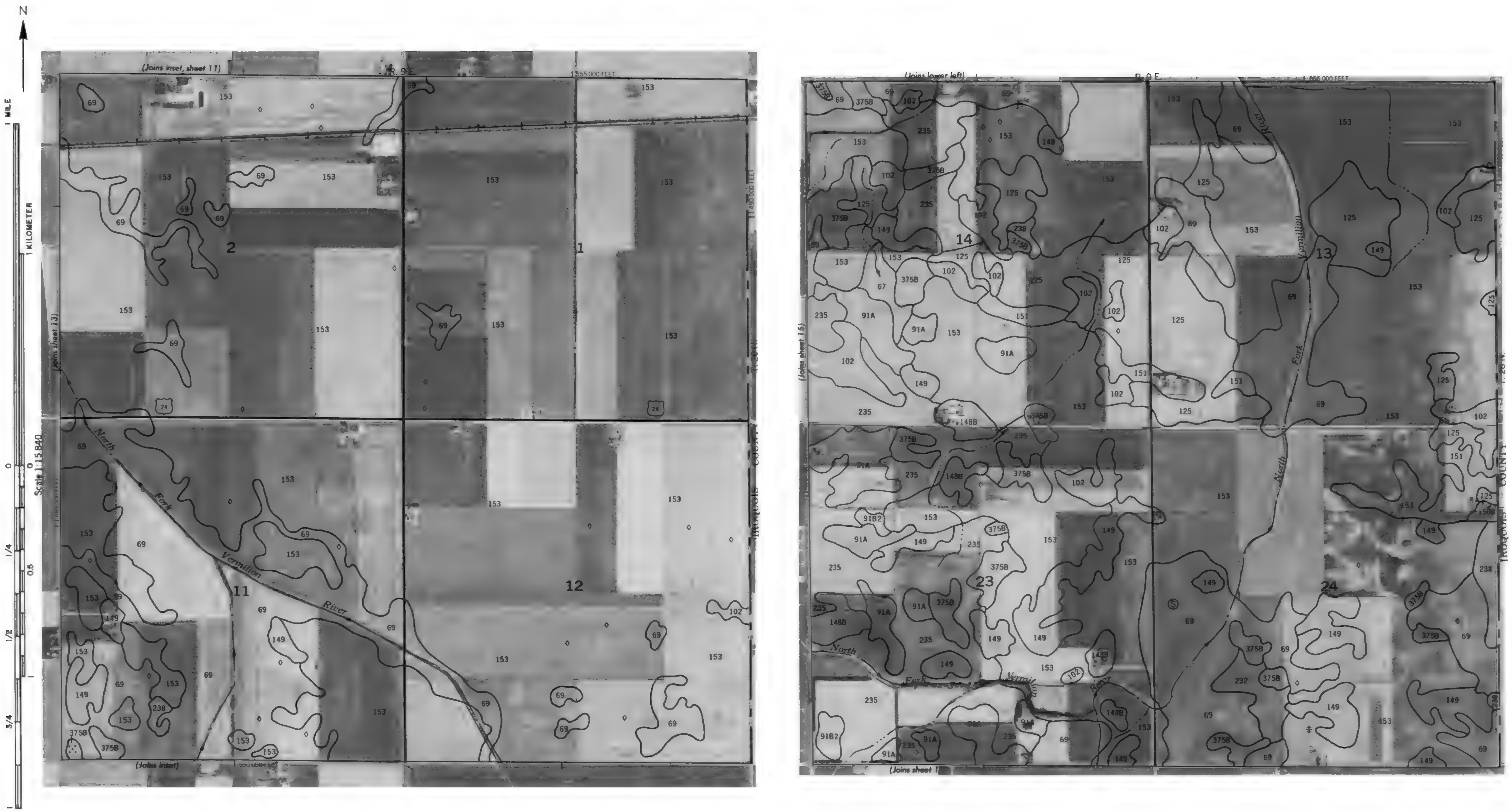
1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4

0 0.5

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 14

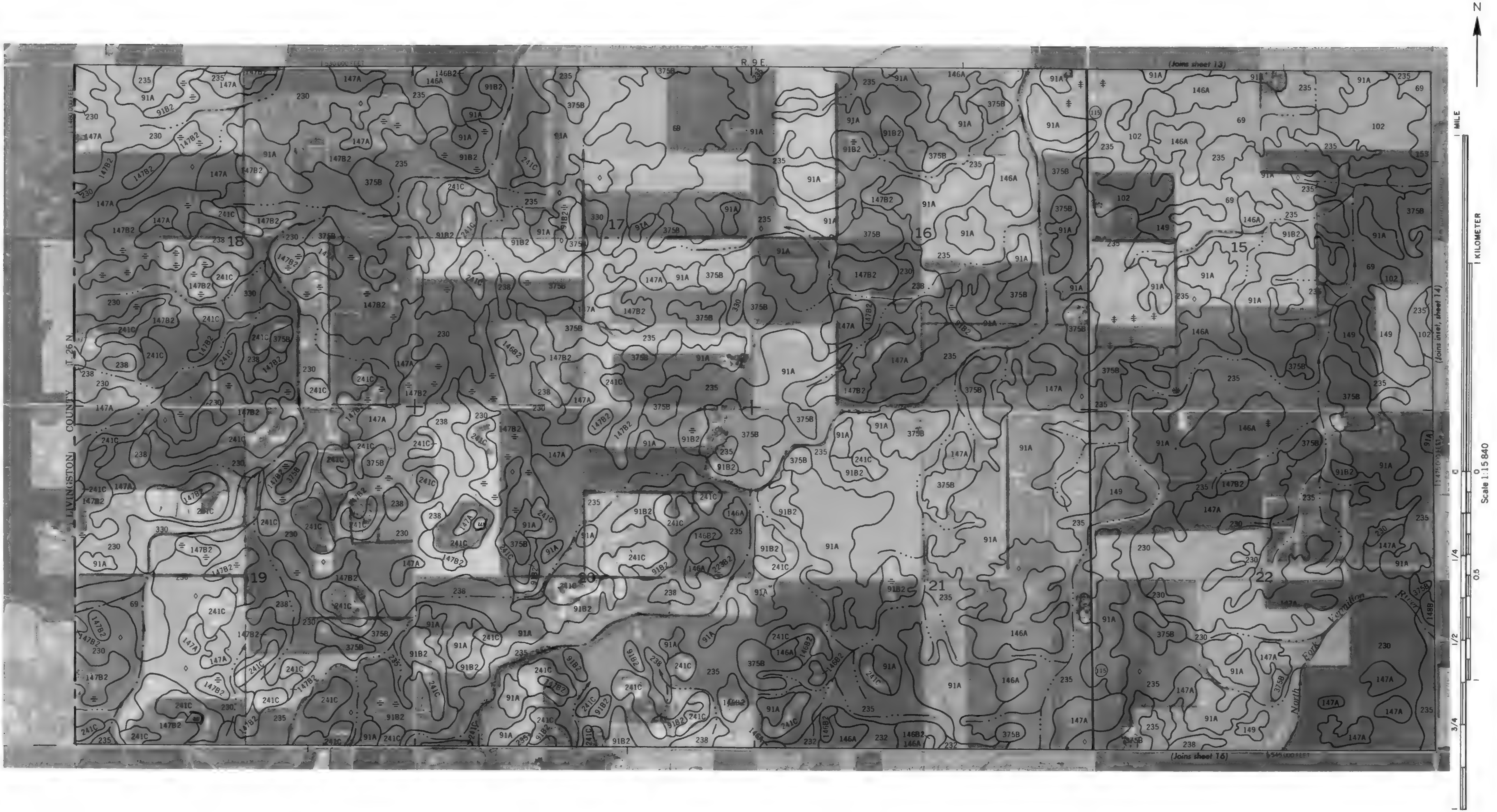


This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 14

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 15

15



FORD COUNTY, ILLINOIS NO. 15

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

16

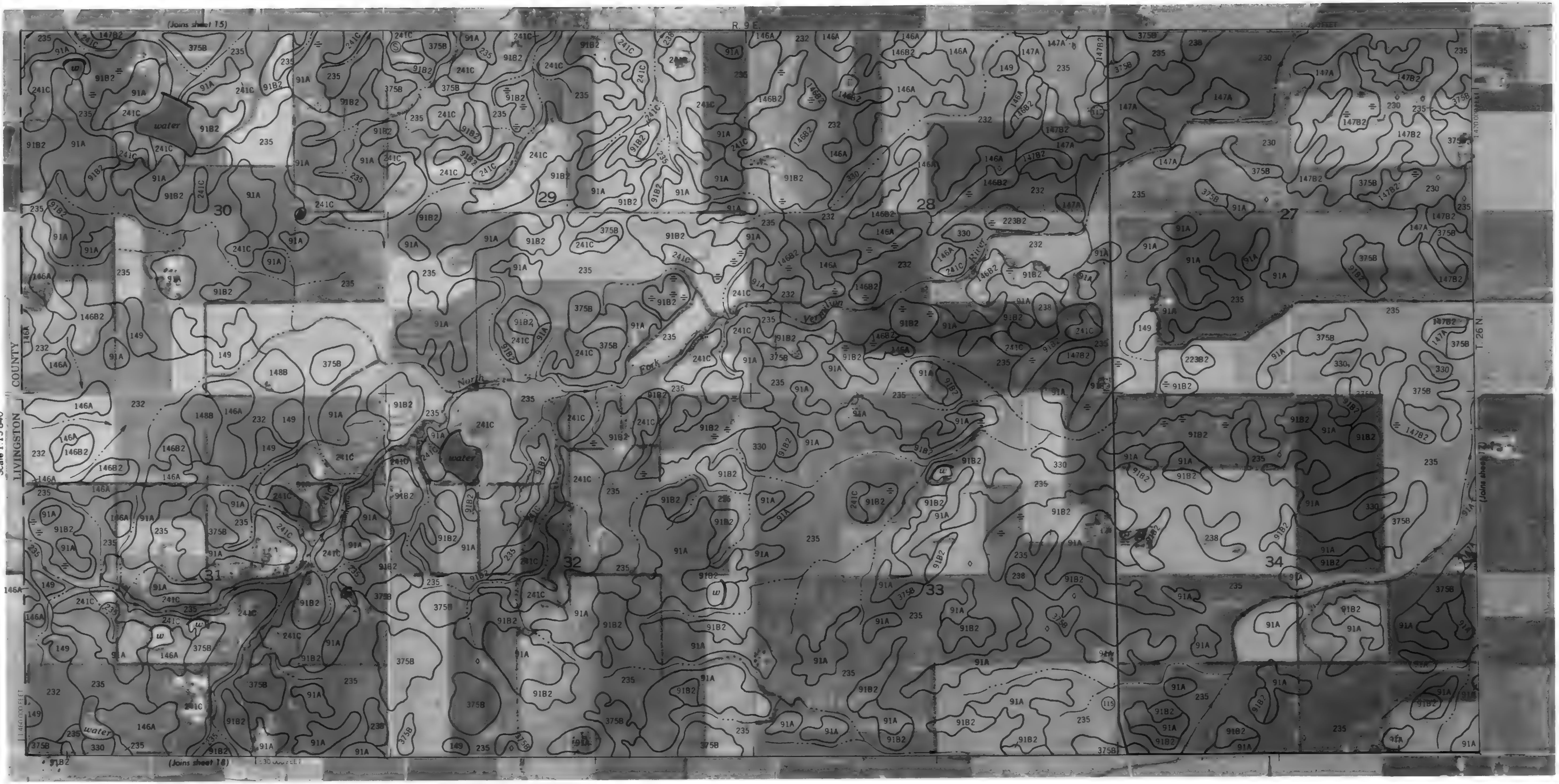
N

1 MILE

1 KILOMETER

Scale 1:15 840

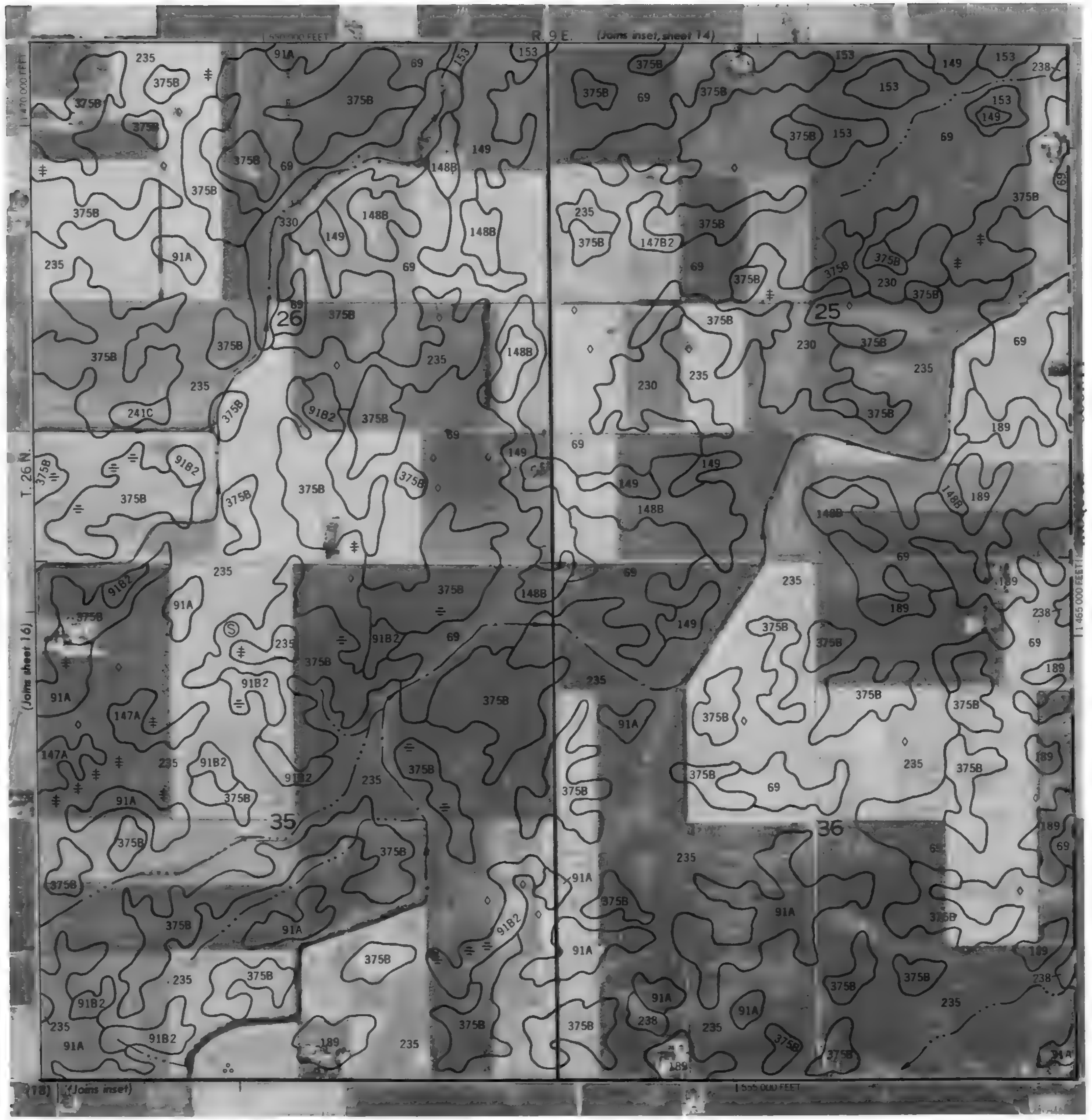
0 1/4 0.5 1/2 3/4

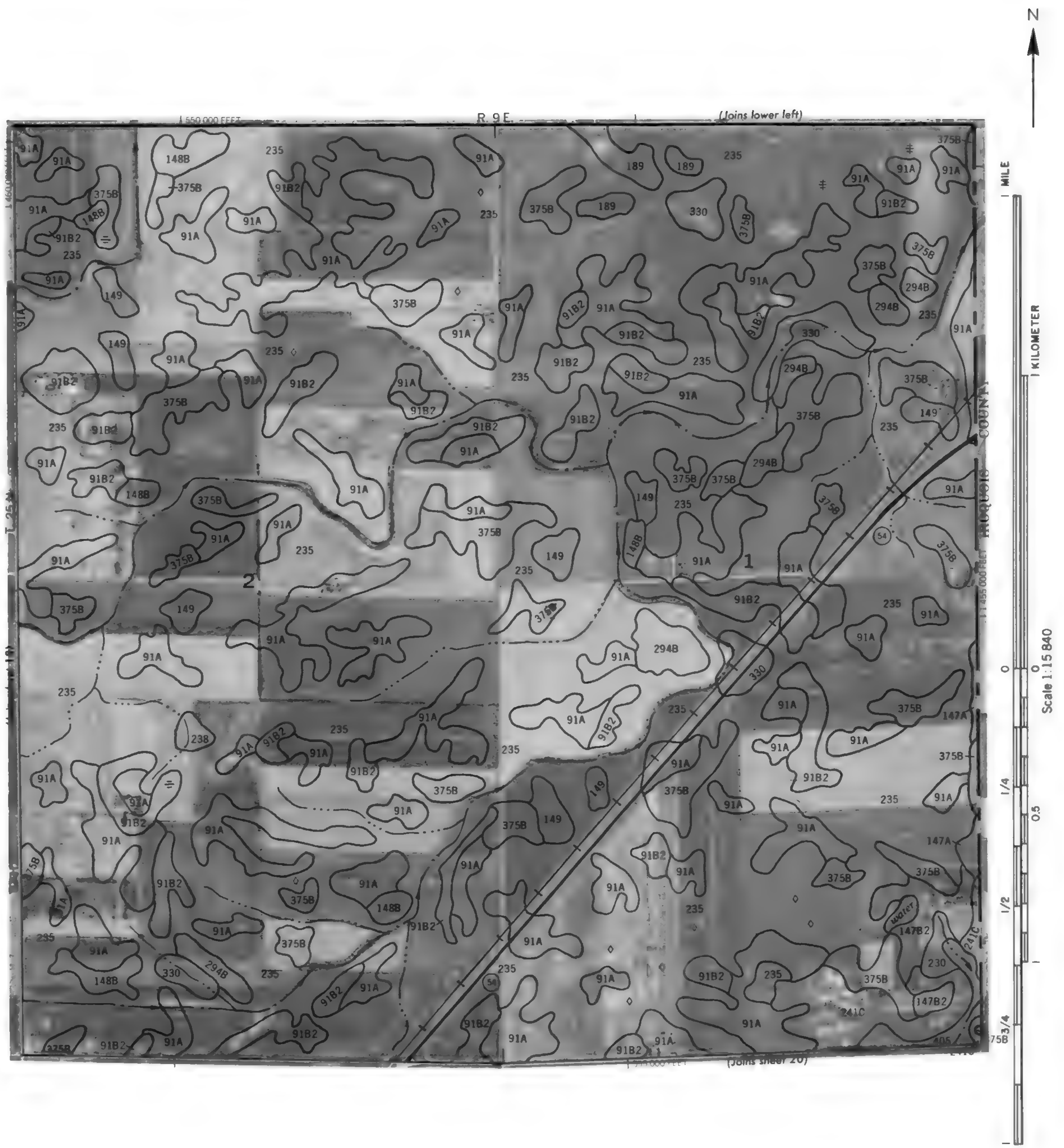


This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

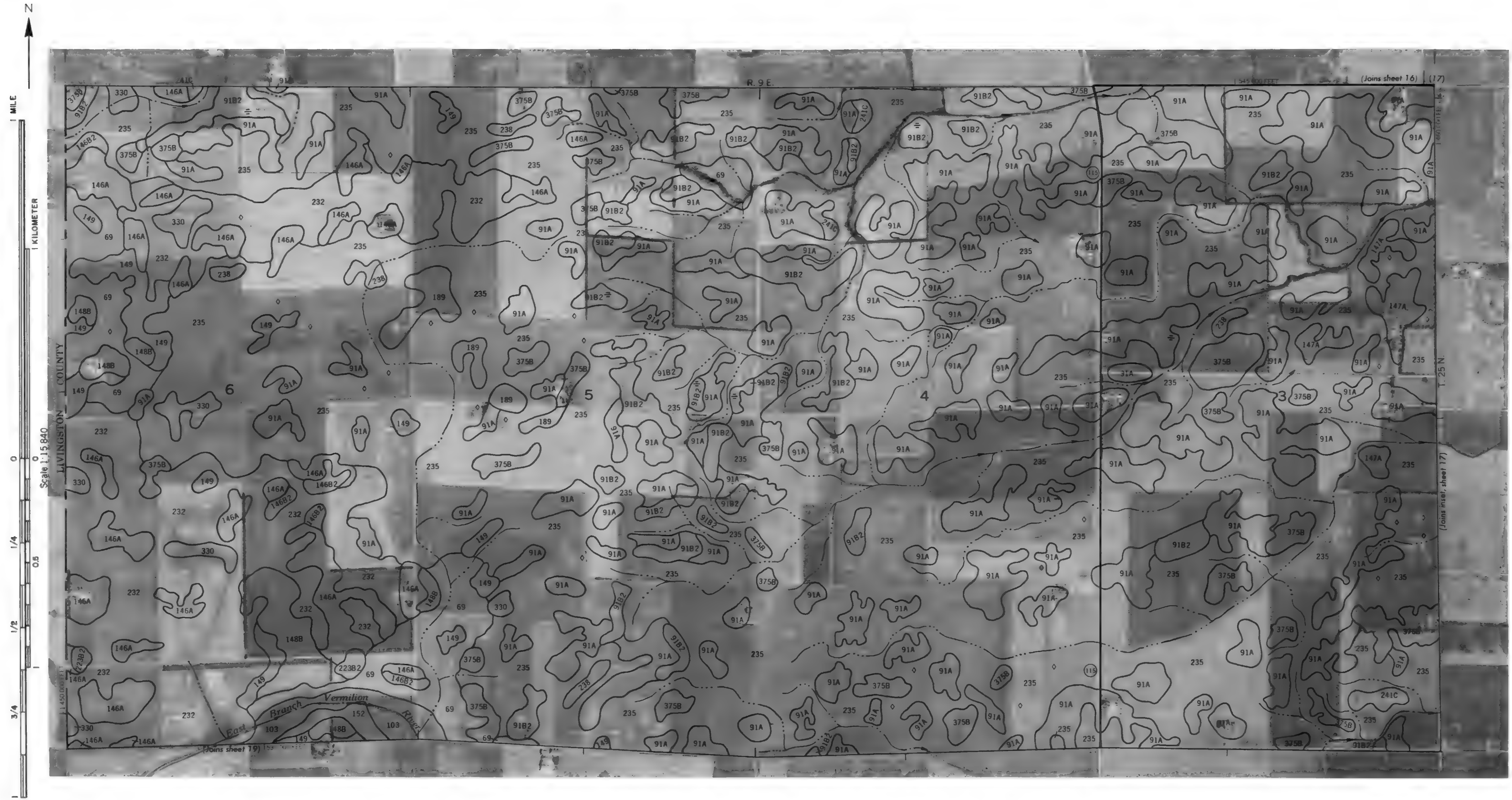
FORD COUNTY, ILLINOIS NO. 17

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.





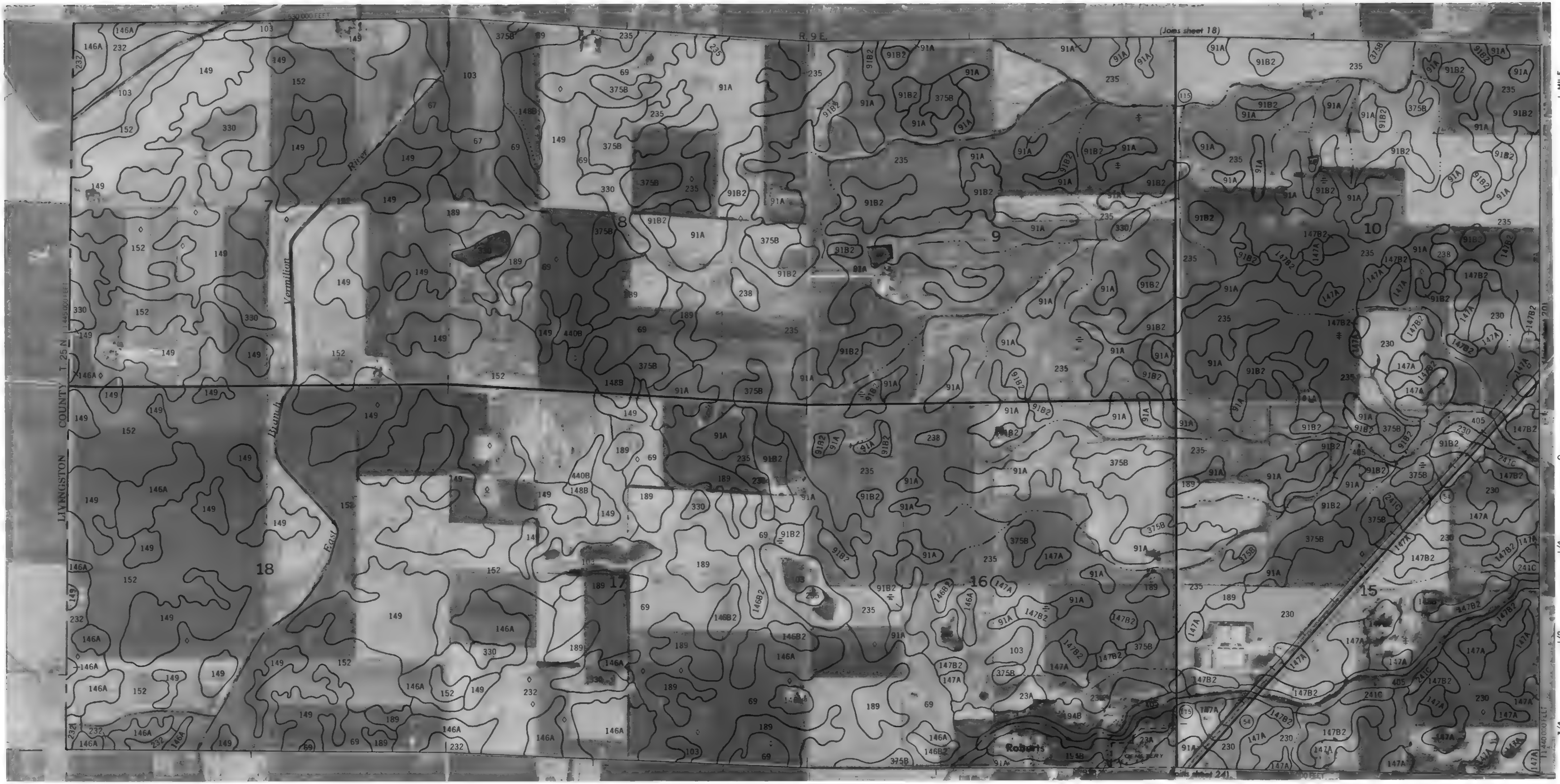
SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 18



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 18

N



FORD COUNTY, ILLINOIS NO. 19

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MILE
KILOMETER
0
1/4
1/2
3/4
0
0.5
Scale 1:15 840

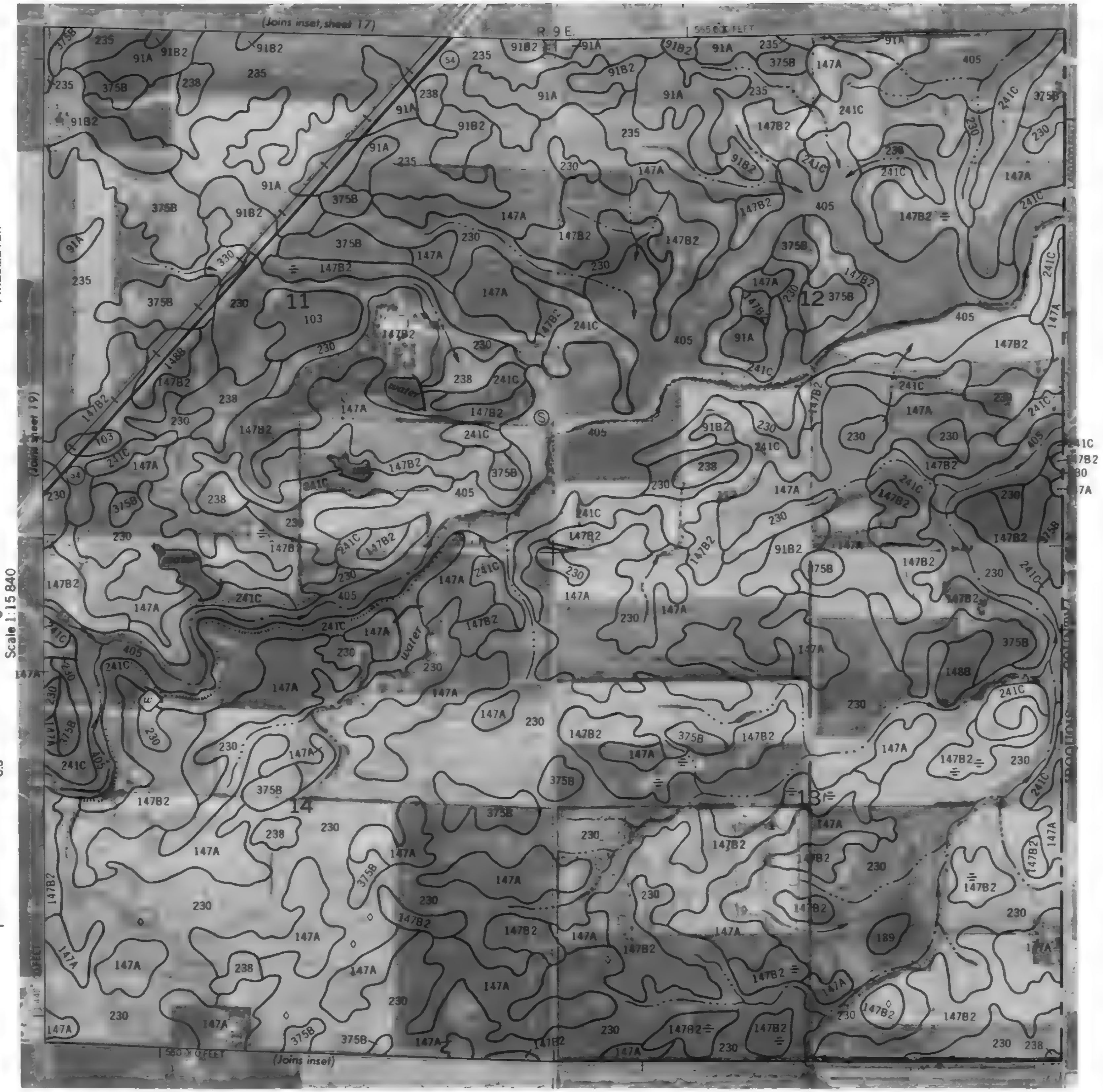
SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 20

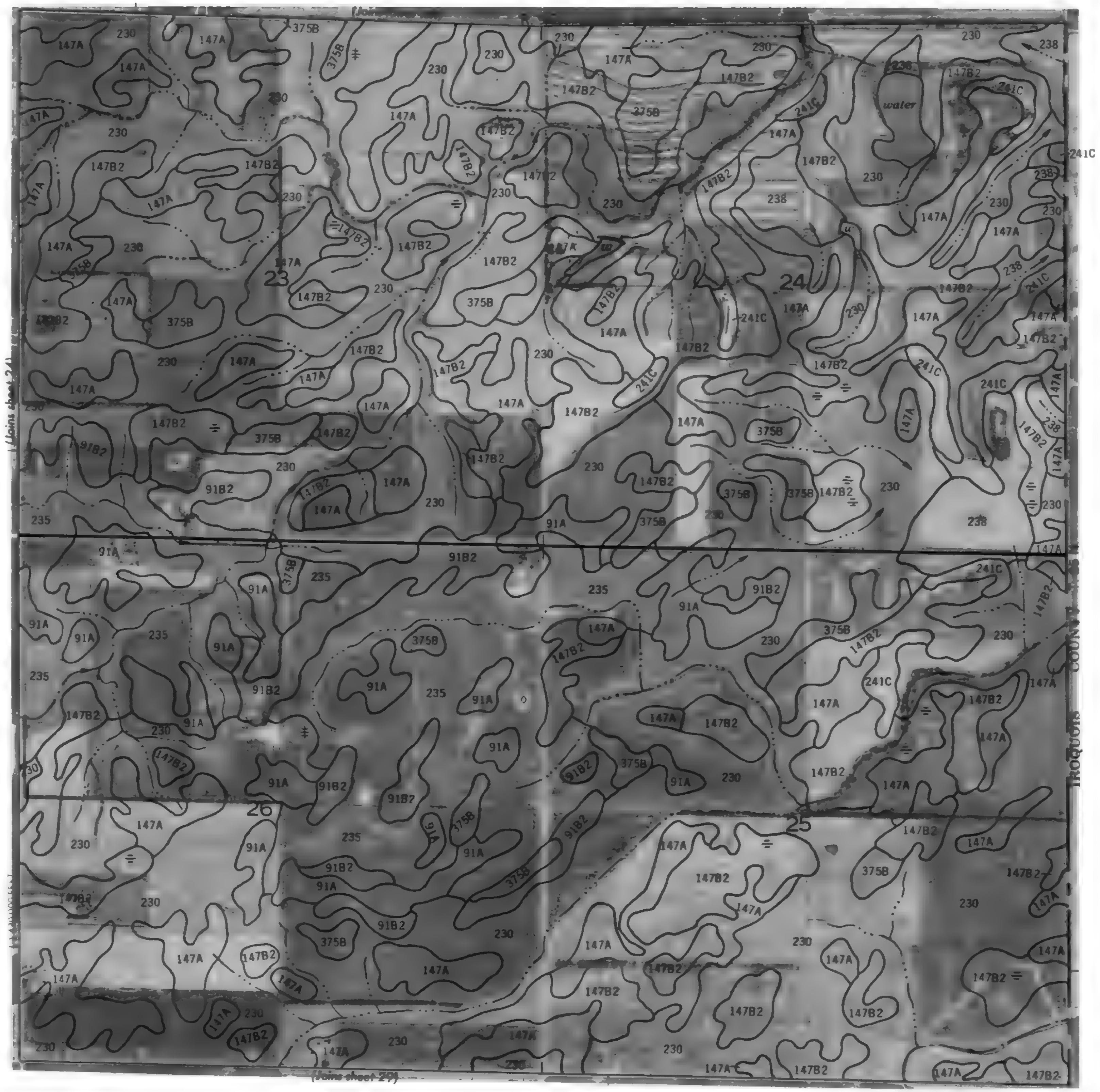
N

1 MILE

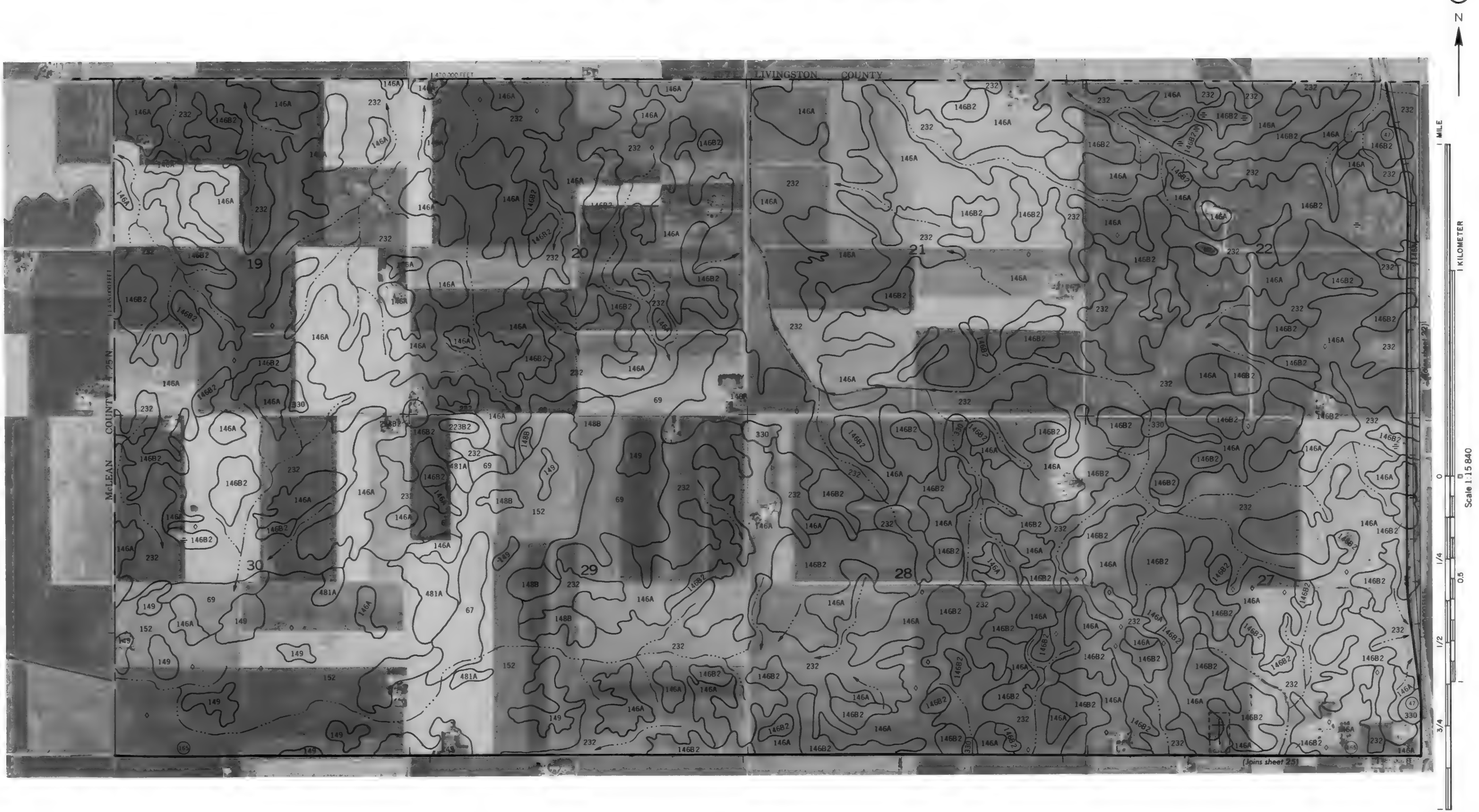
1 KILOMETER

Scale 1:15 840





This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



FORD COUNTY, ILLINOIS NO. 21

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 22

N

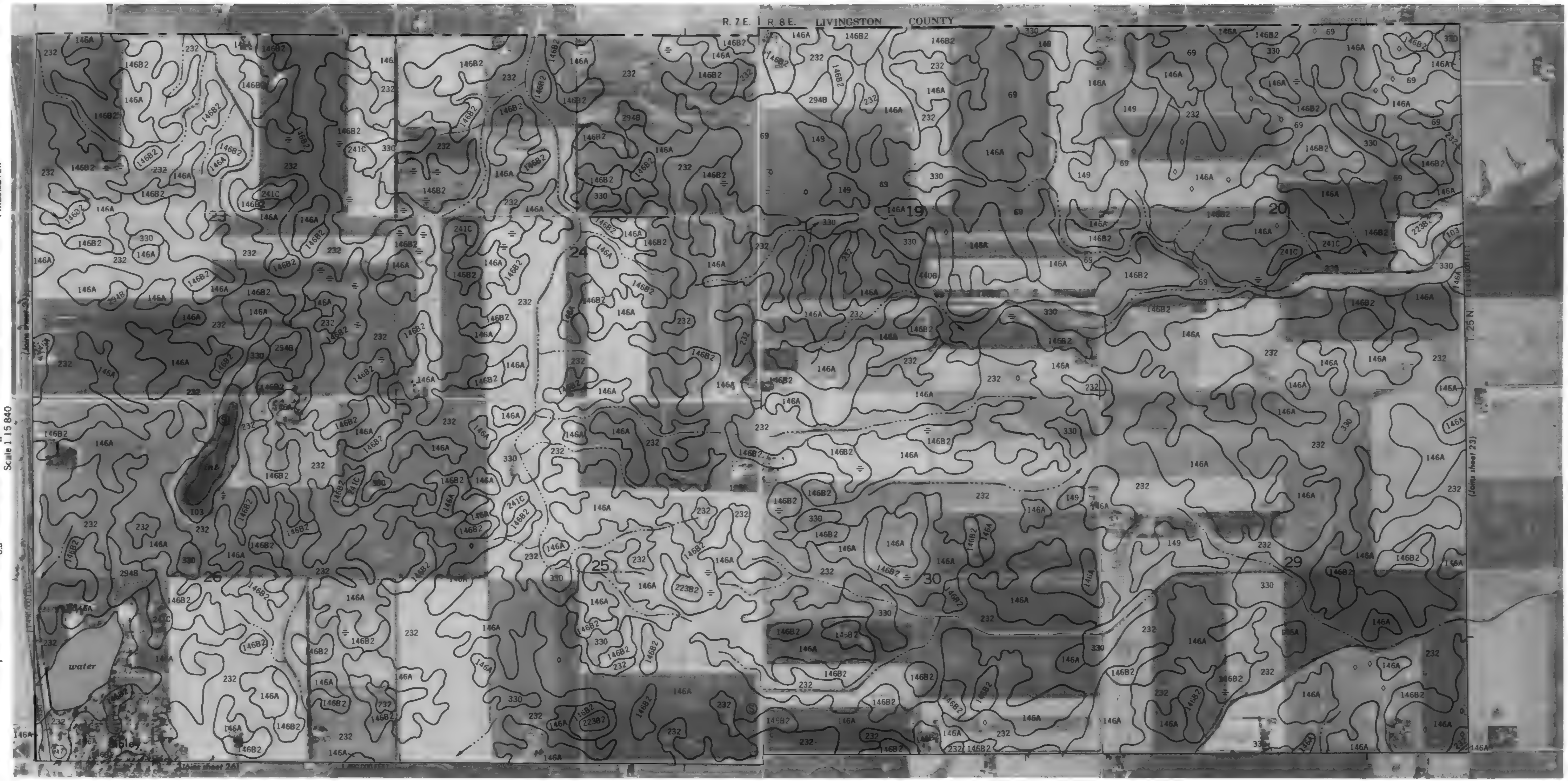
1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1

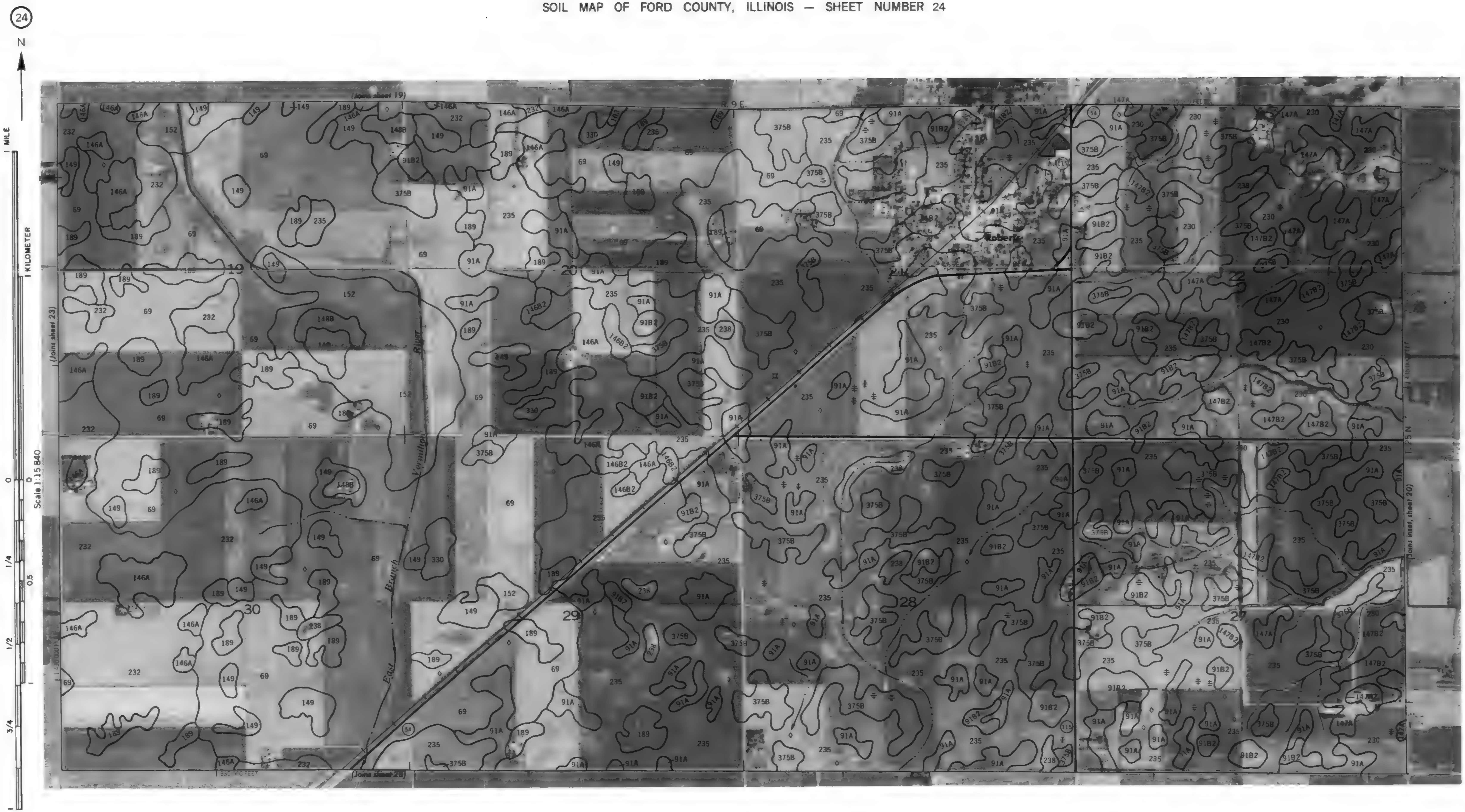


This soil survey map is compiled on 1979 aerial photographs by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 23

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 24

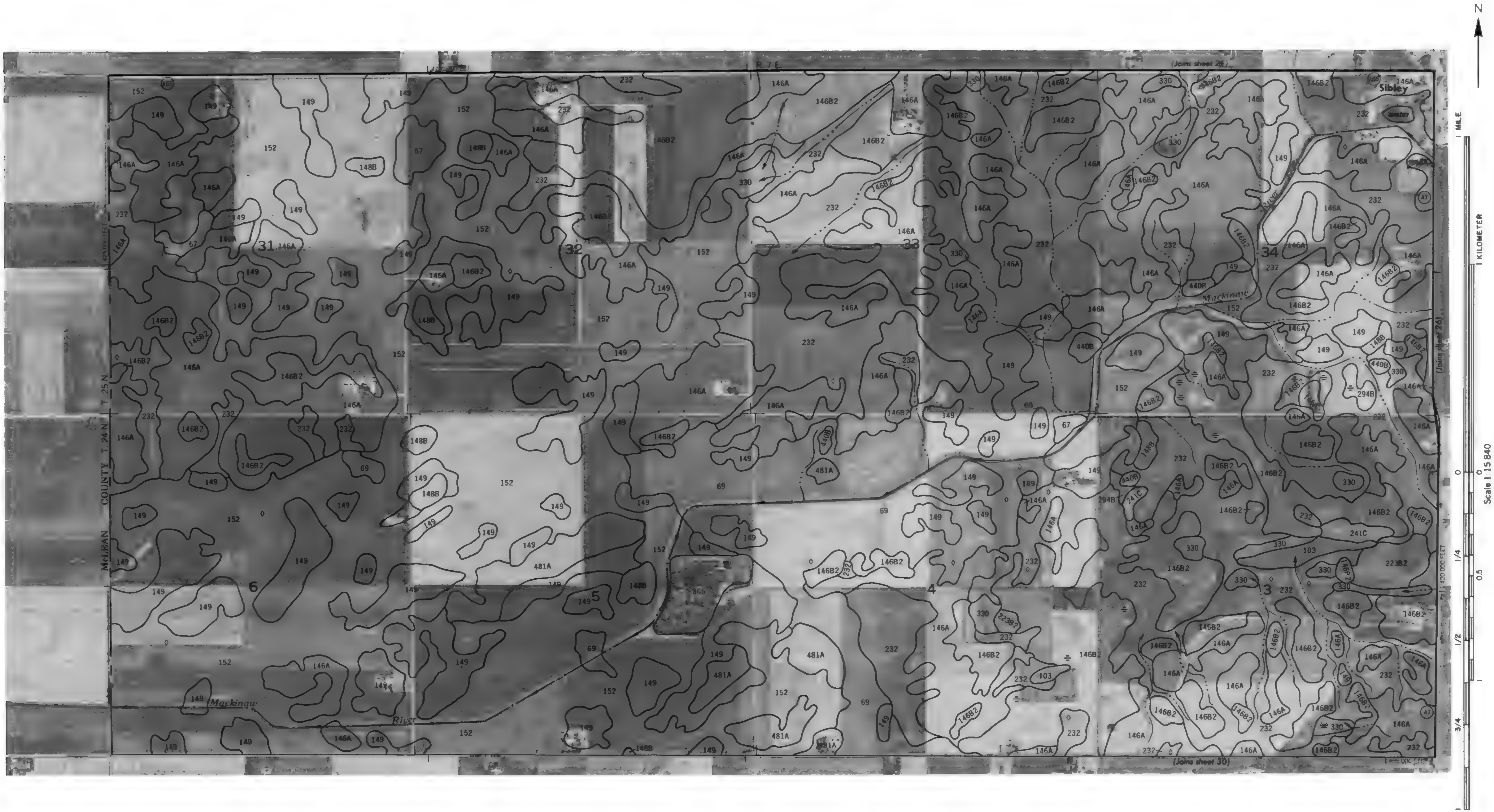


This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 24

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 25

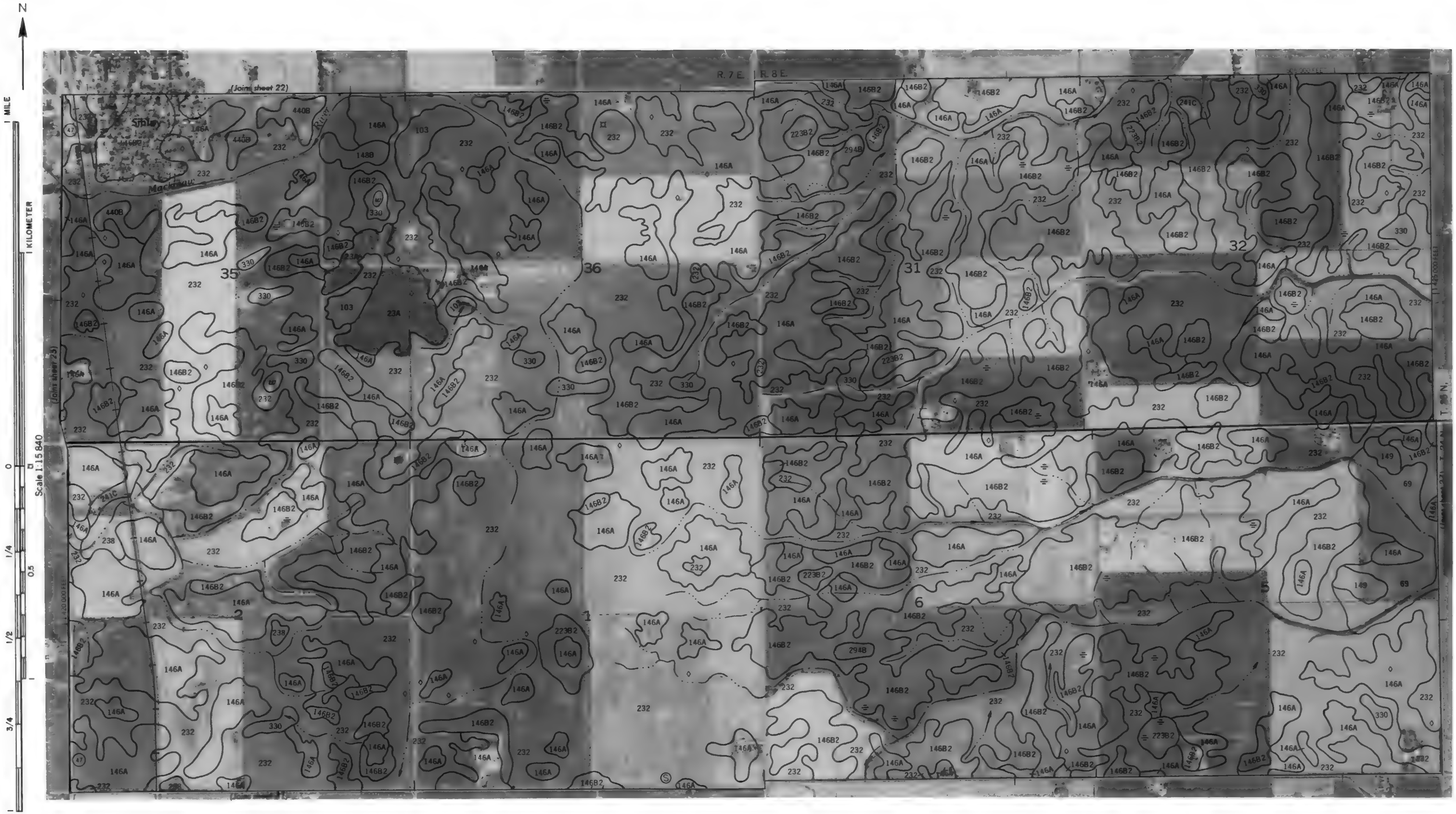
25



FORD COUNTY, ILLINOIS NO. 25

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 26

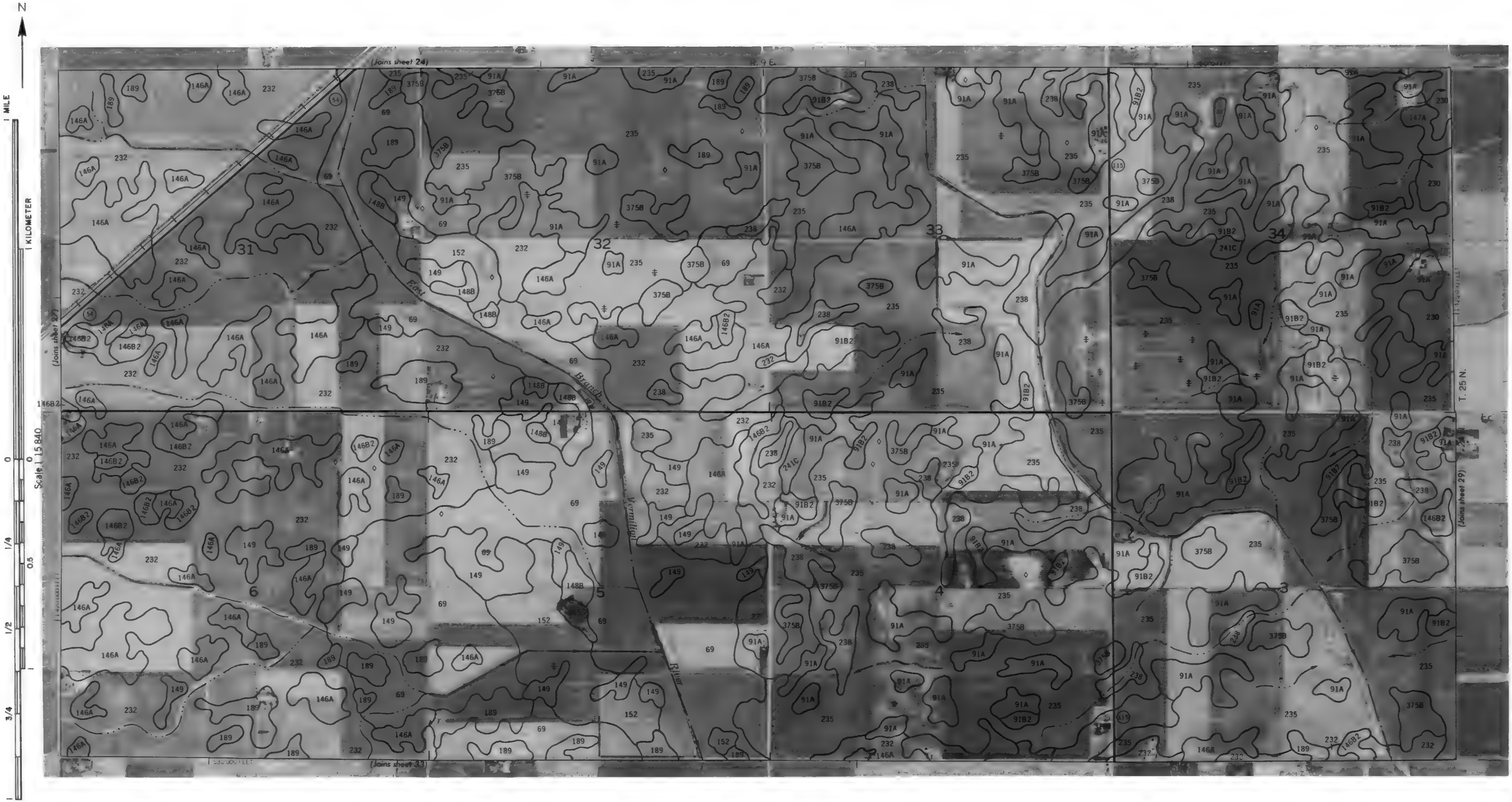


This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 27

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 28

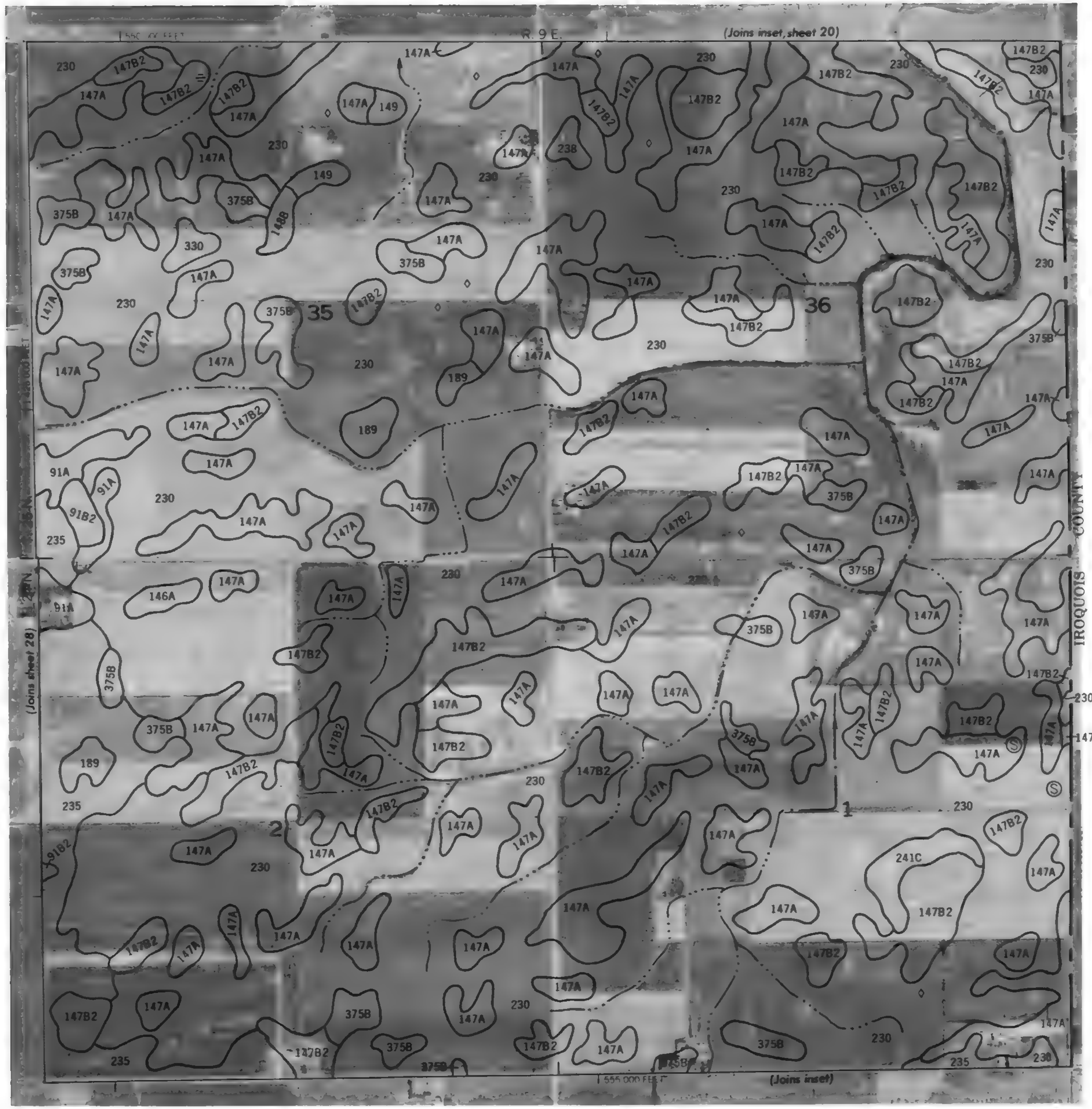


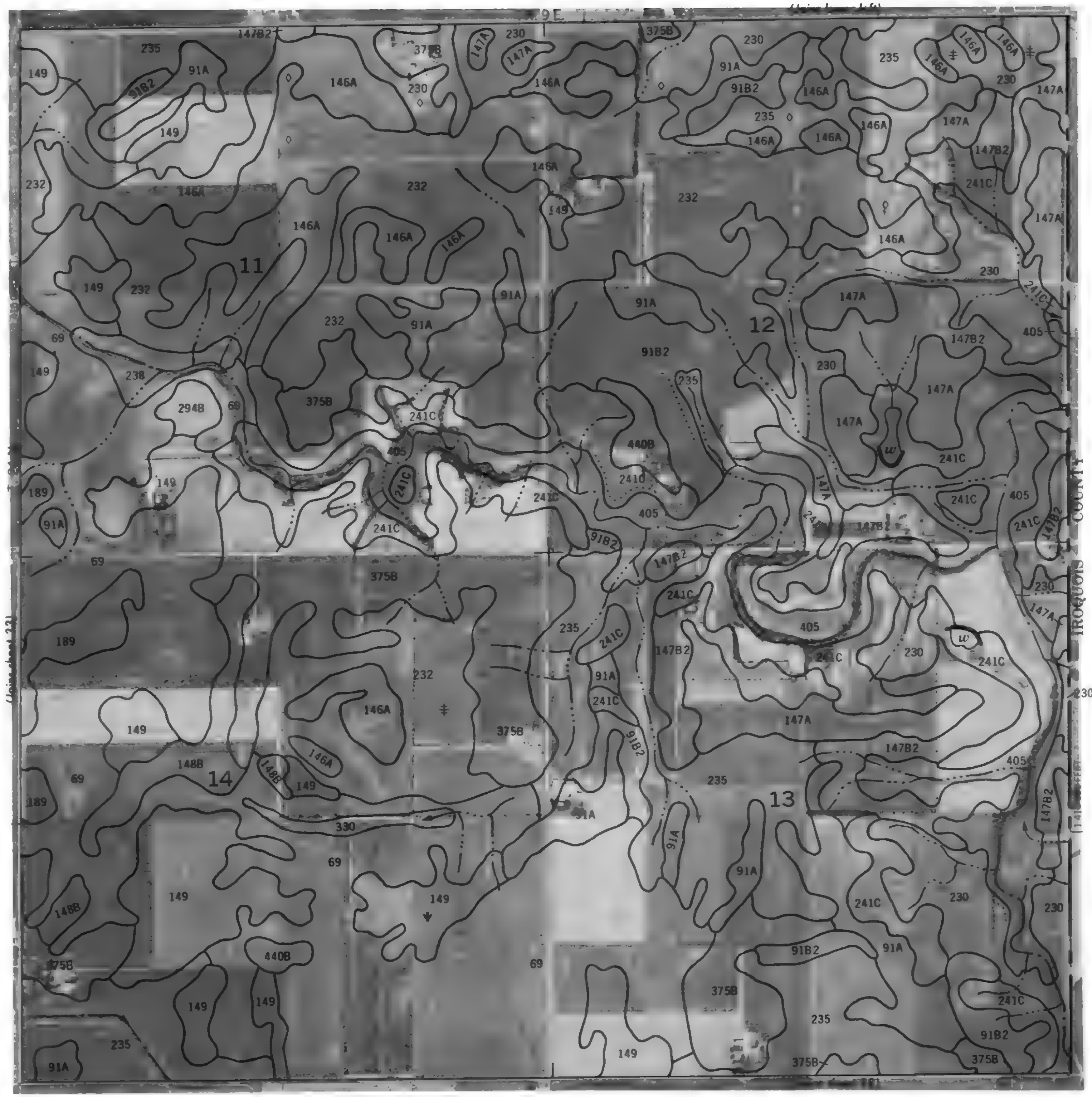
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners if shown are approximately positioned.

N

FORD COUNTY, ILLINOIS NO. 29

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

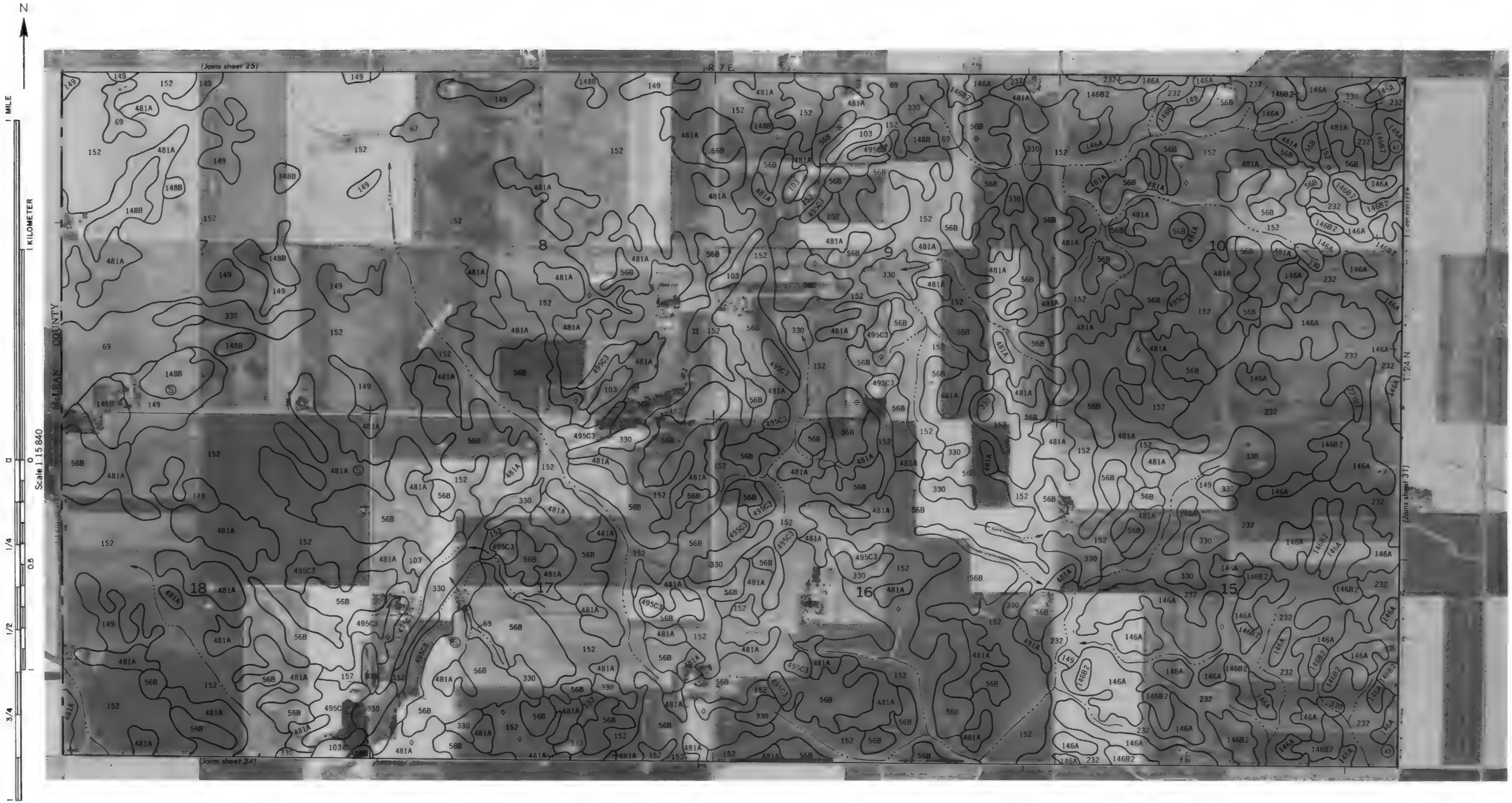




MILE
KILOMETER
Scale 1:15 840

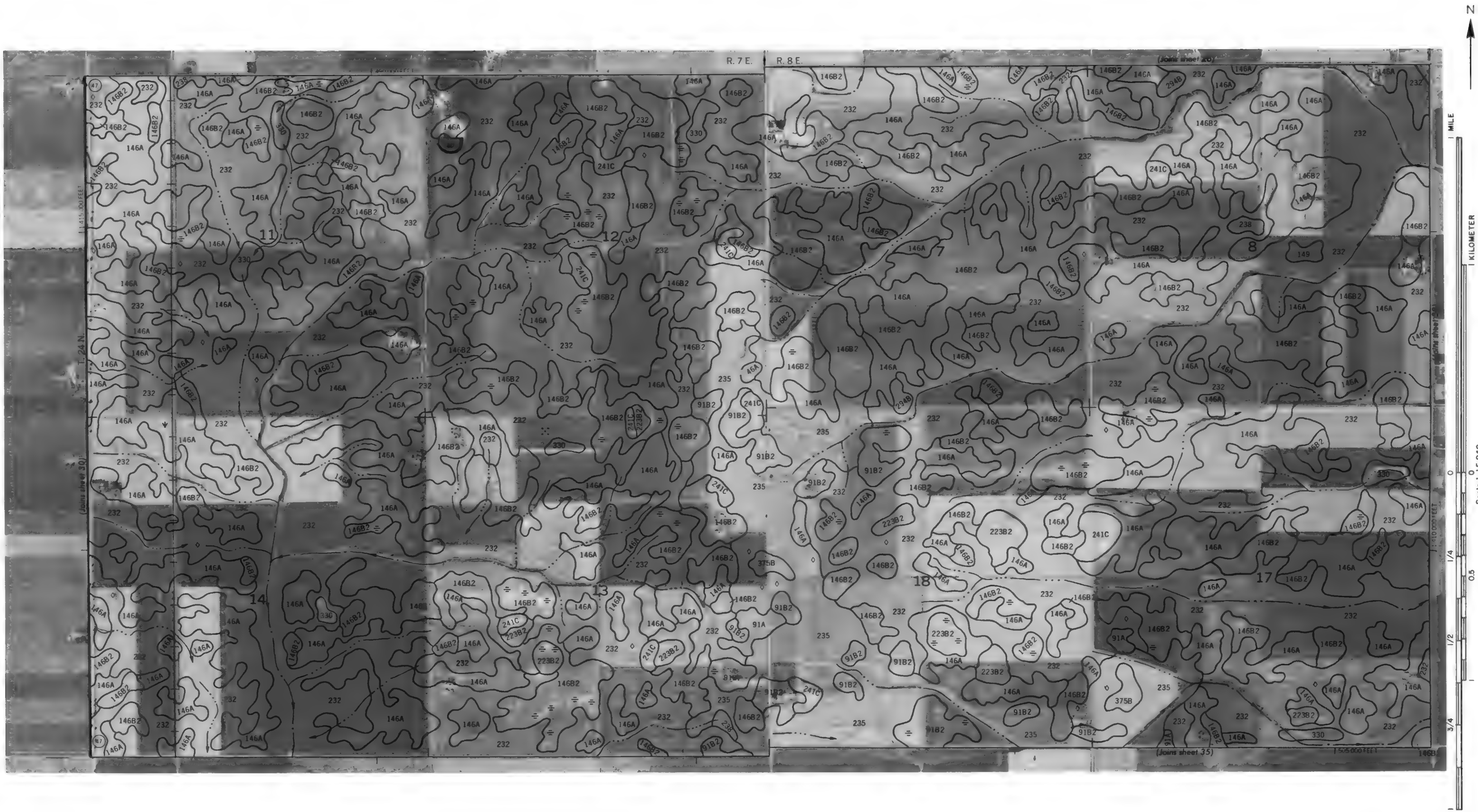
(30)

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 30



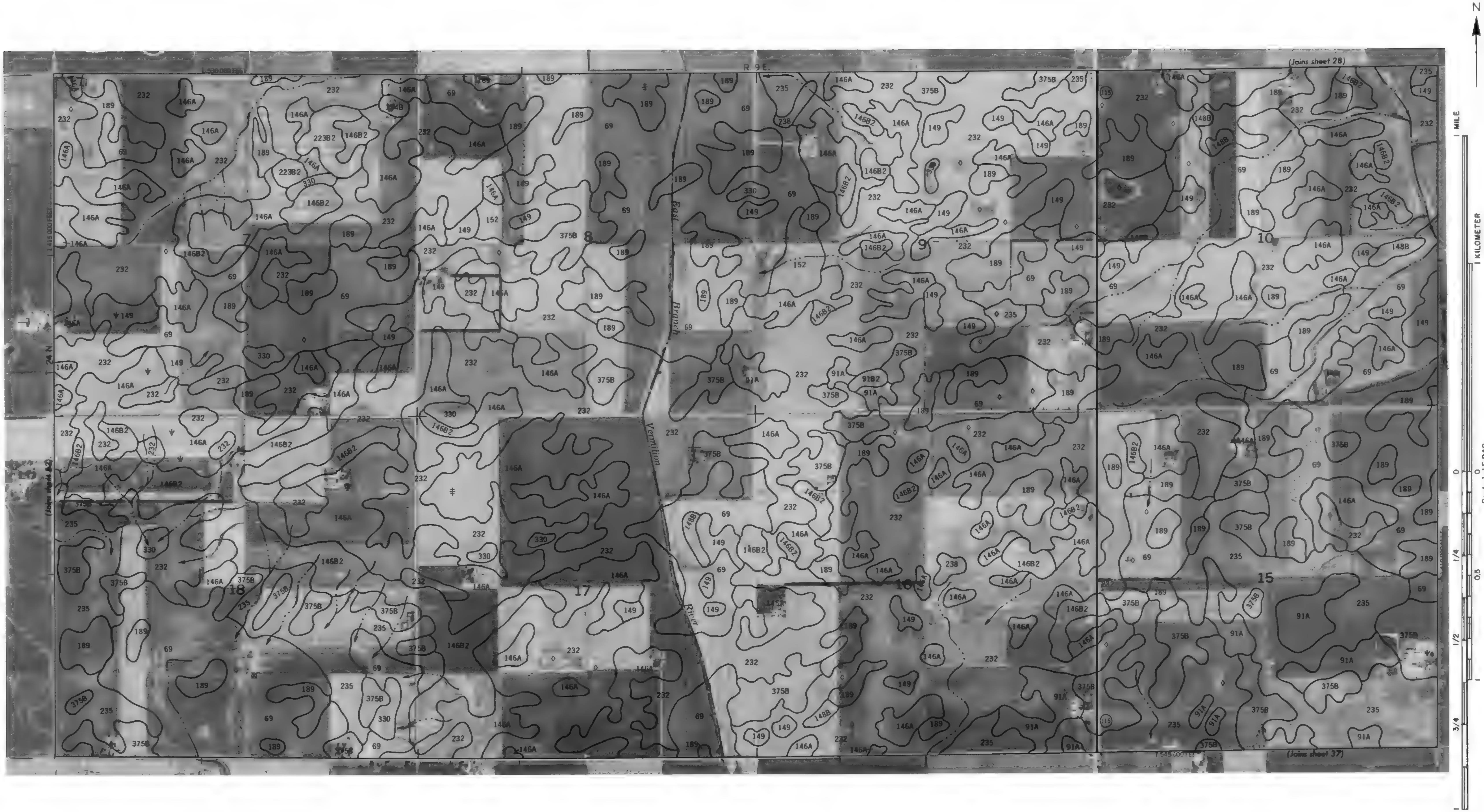
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 30


N
R. 7 E.
R. 8 E.
T. 24 N.
(Joins sheet 30)
(Joins sheet 35)
11
12
7
8
14
13
18
17
MILE
KILOMETER
Scale 1:15 840
FORD COUNTY, ILLINOIS NO. 31
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 32

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



FORD COUNTY, ILLINOIS NO. 33

This soil survey map is compiled on 1979 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

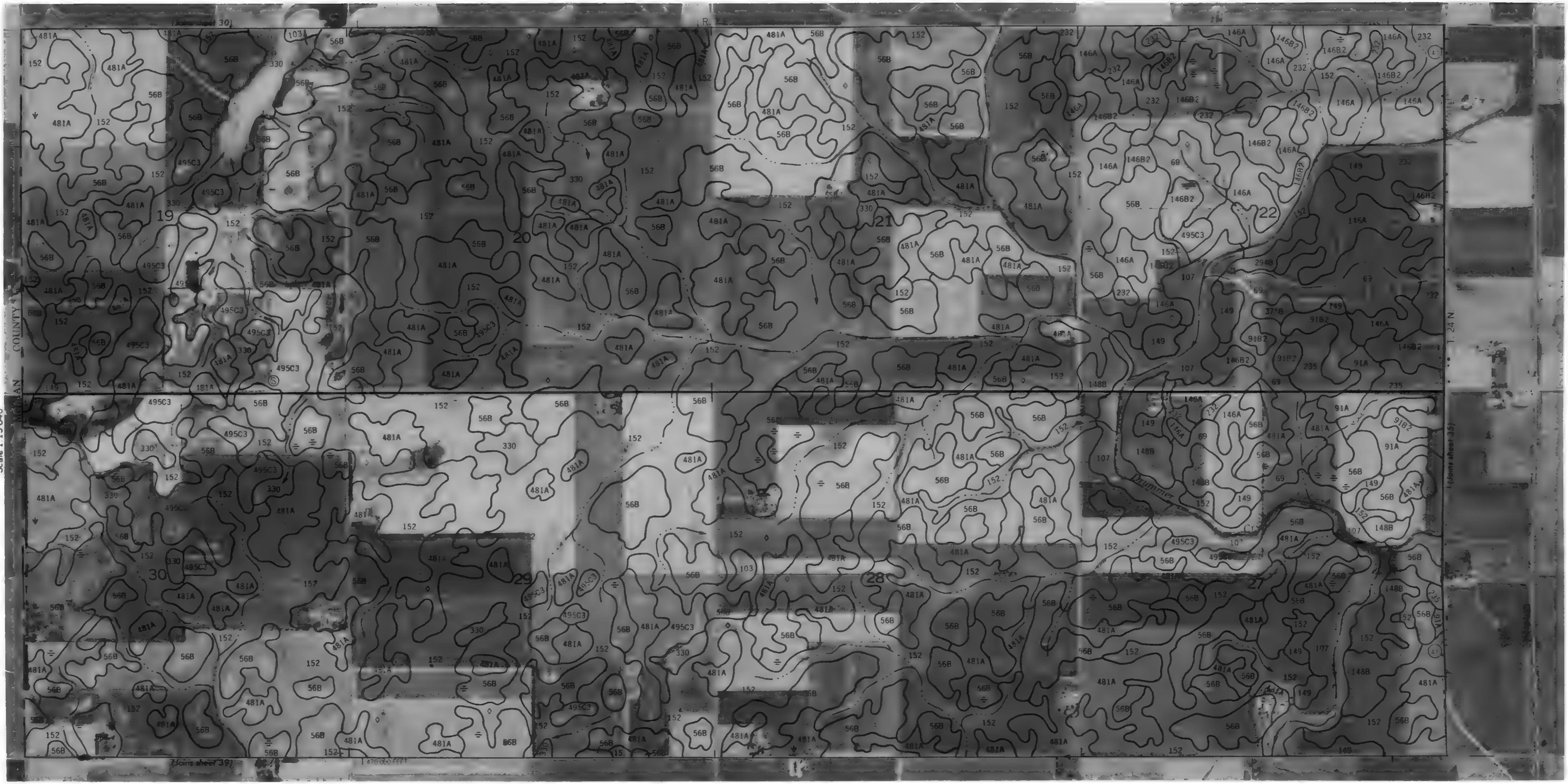
N

1 MILE

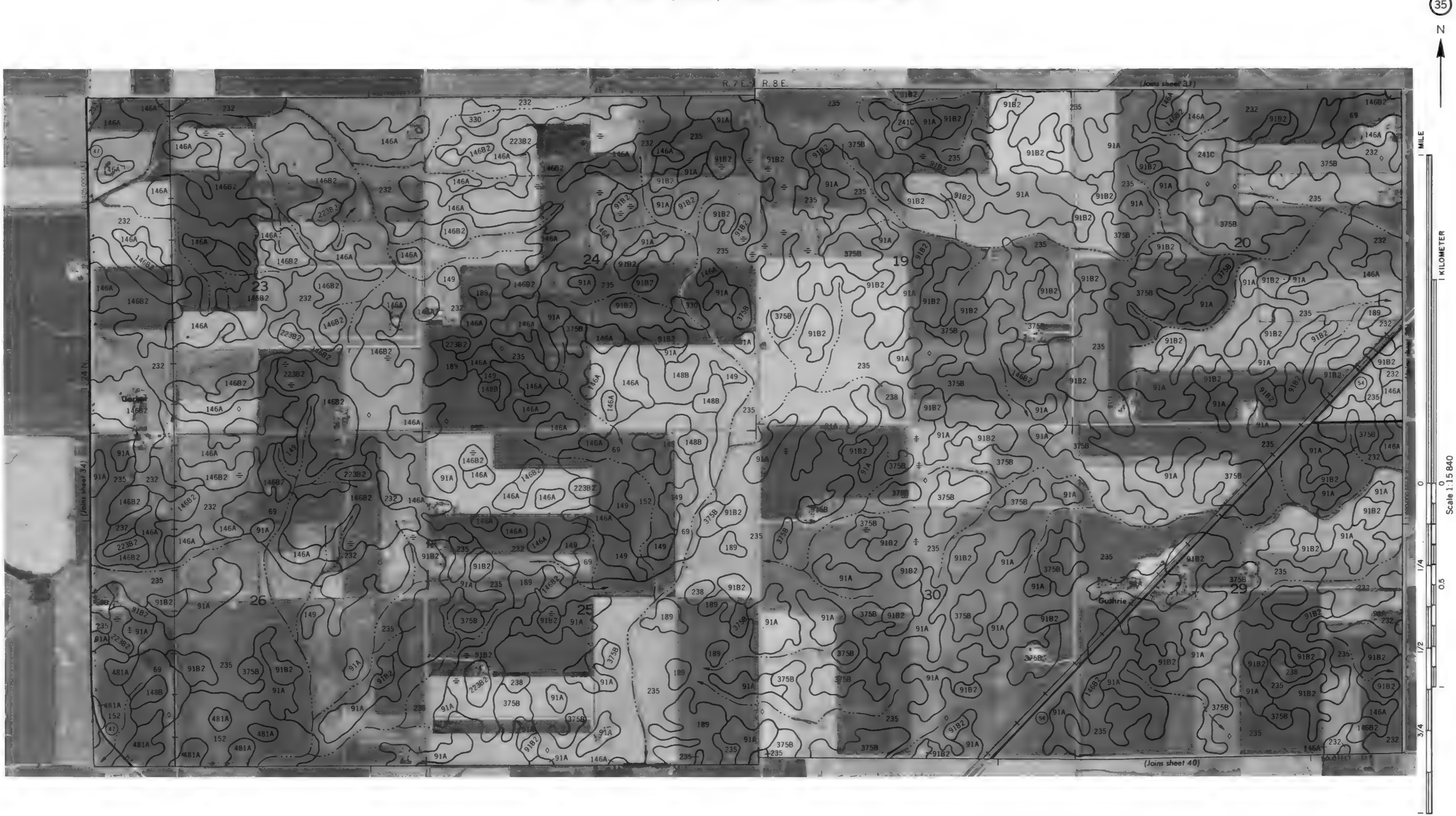
1 KILOMETER

Scale 1:15 840

0 0 1/4 0.5 1/2 3/4



SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 35



FORD COUNTY, ILLINOIS NO. 35

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 36

N

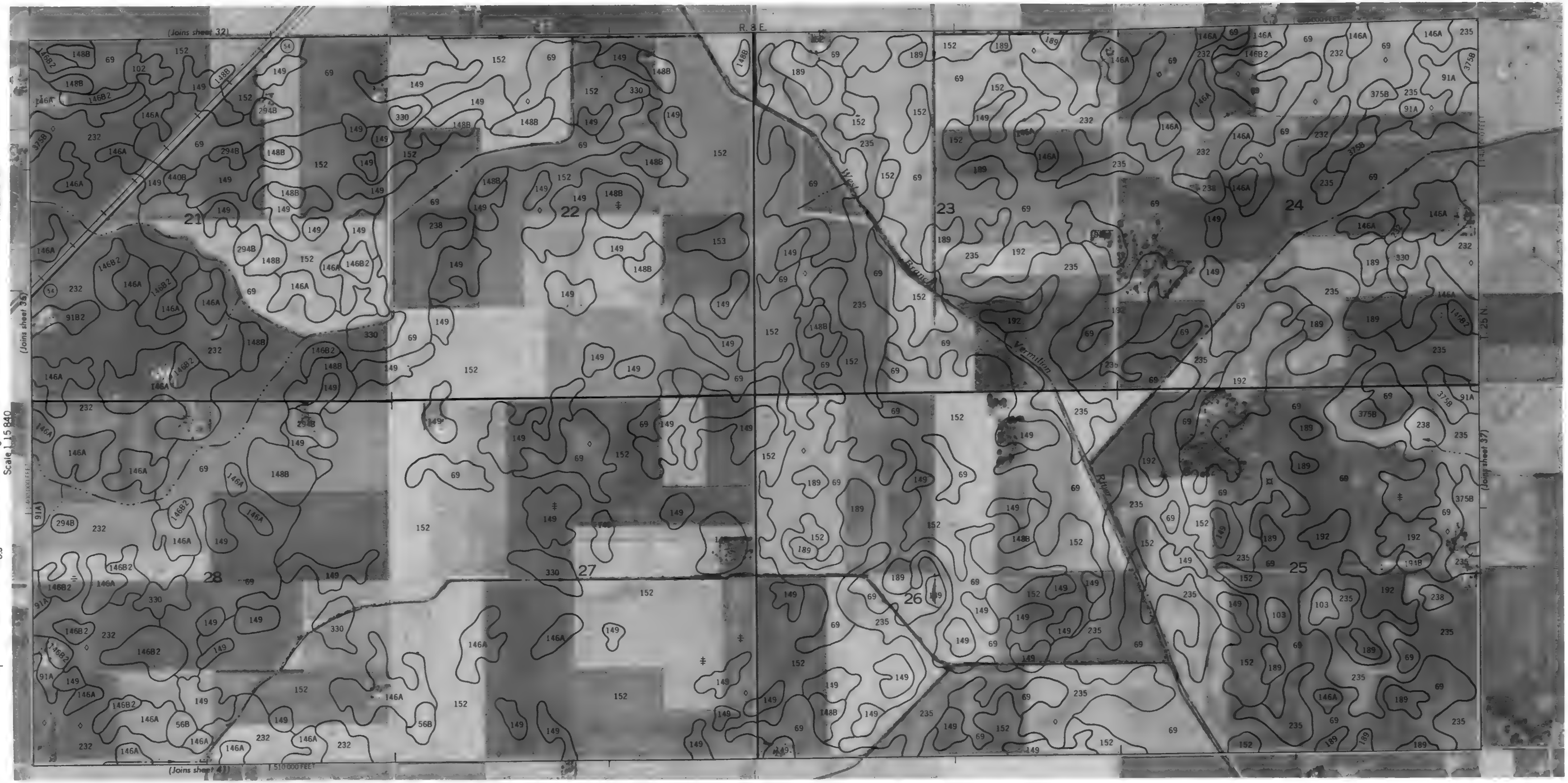
1 MILE

1 KILOMETER

Scale 1:15 840

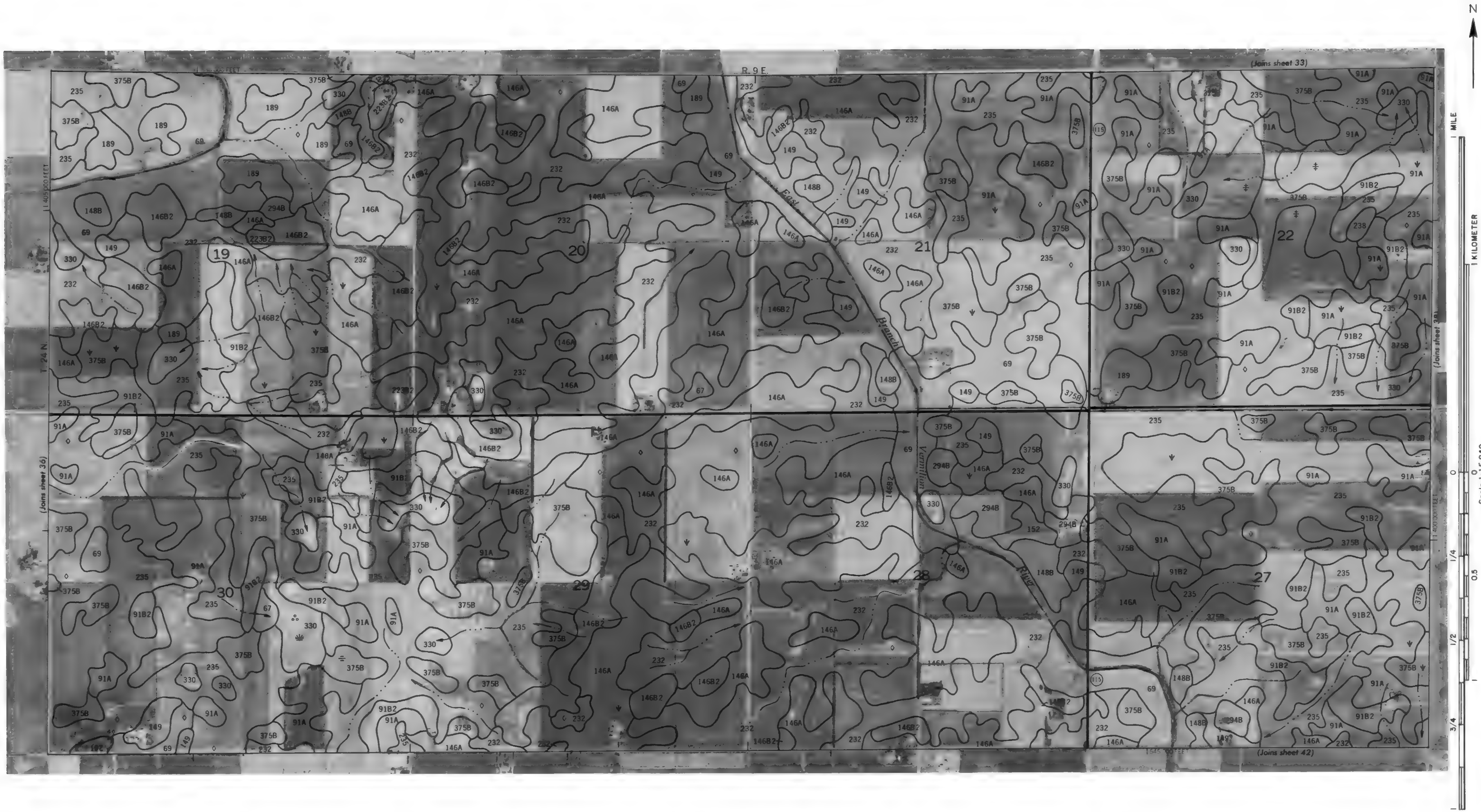
0 1/4 1/2 3/4 1

0 0.5 1



This soil survey map is compiled on 1979 aerial photography by the U S Department of Agriculture Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners if shown are approximately positioned

37

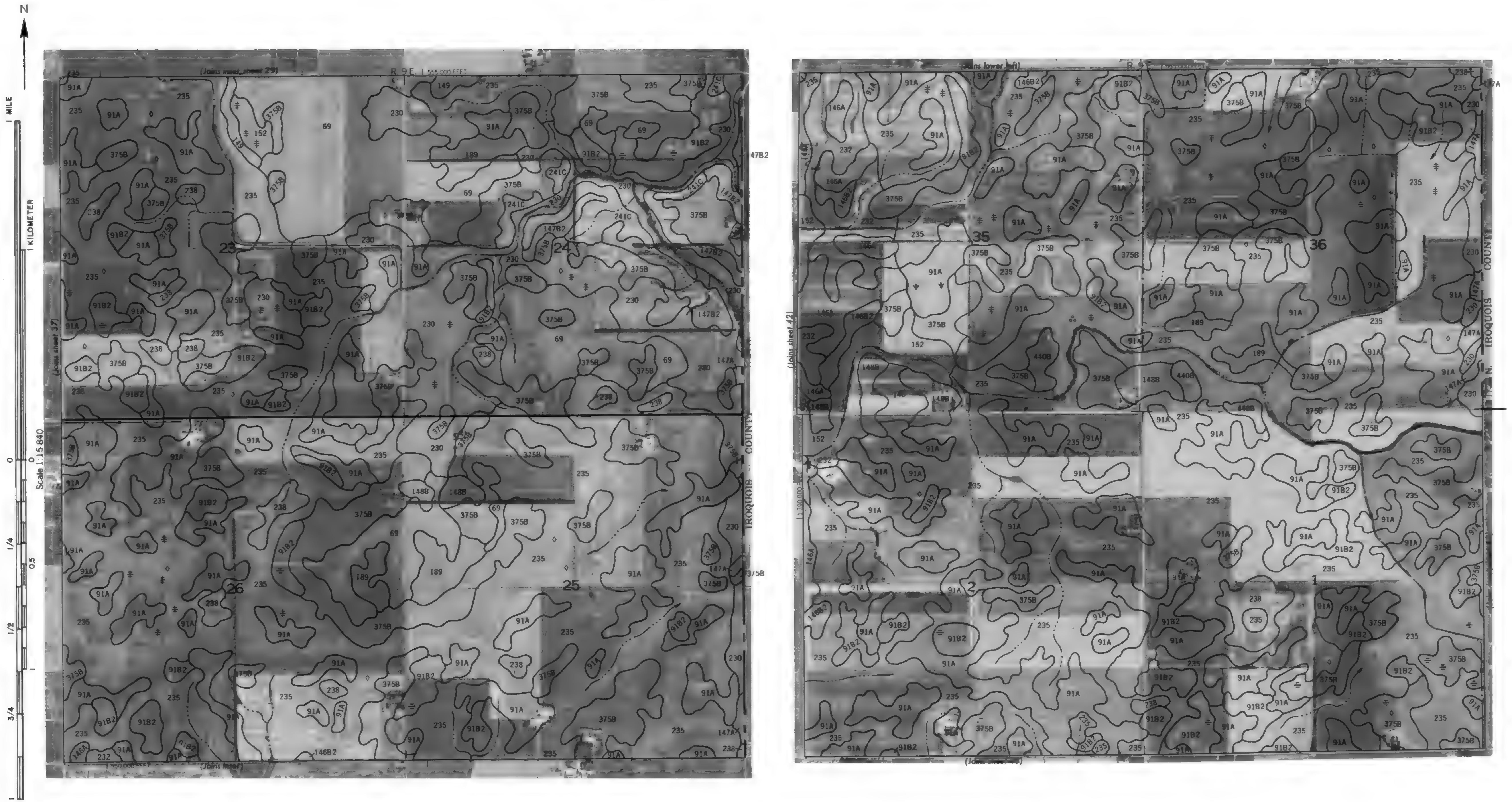


FORD COUNTY, ILLINOIS NO. 37

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

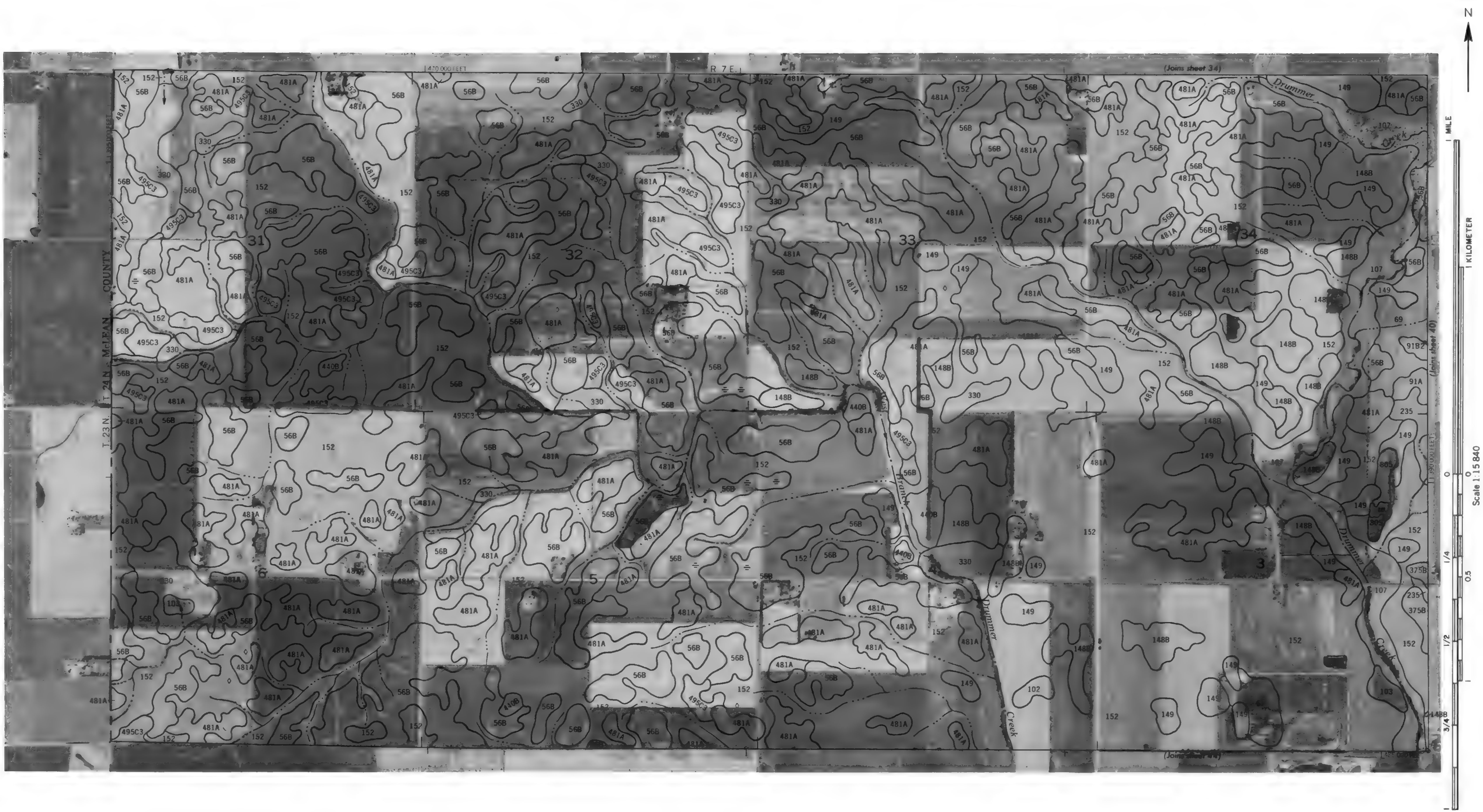
(38)

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 38



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 38



FORD COUNTY, ILLINOIS NO. 39

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 40

N

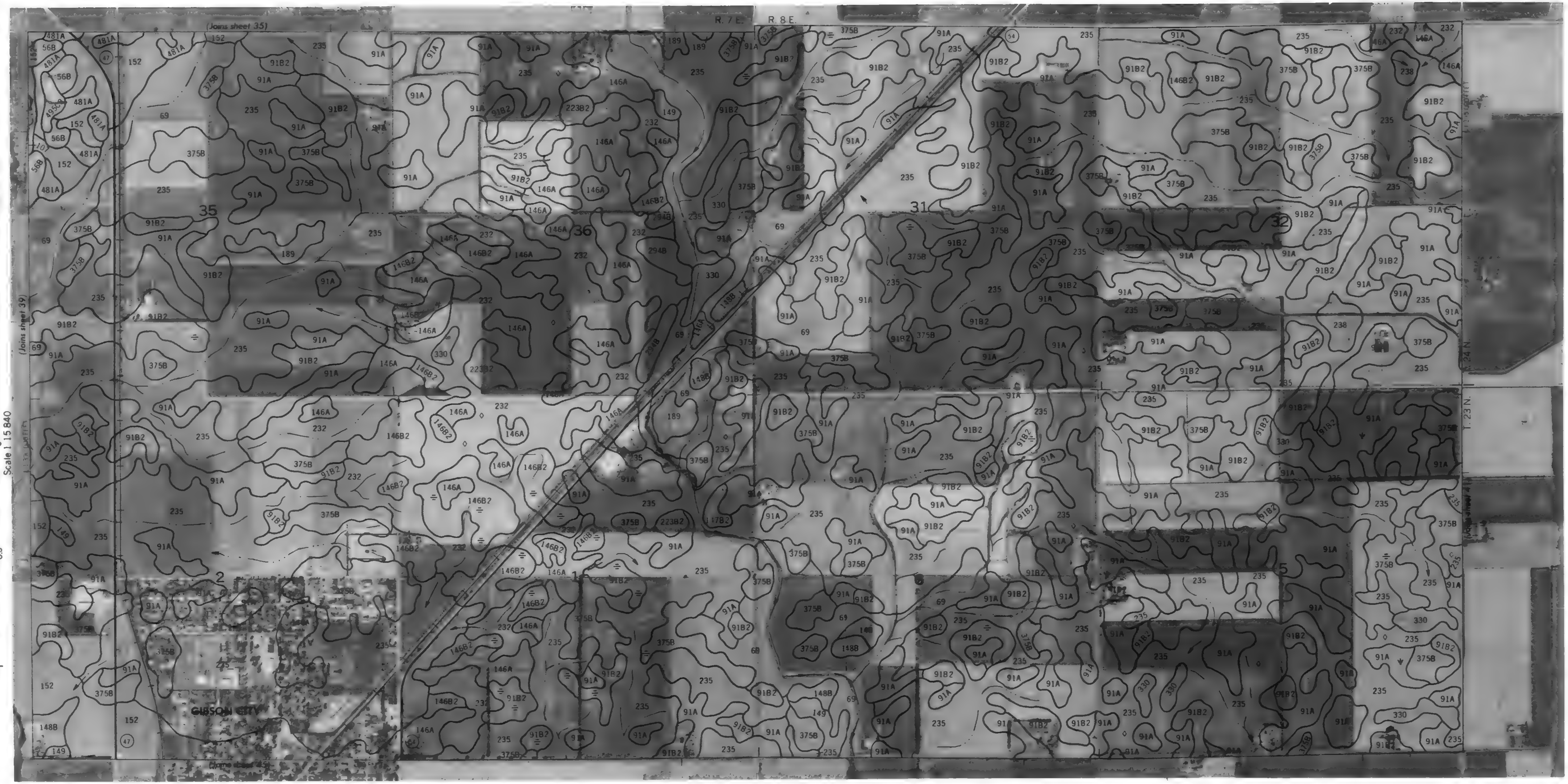
1 MILE

1 KILOMETER

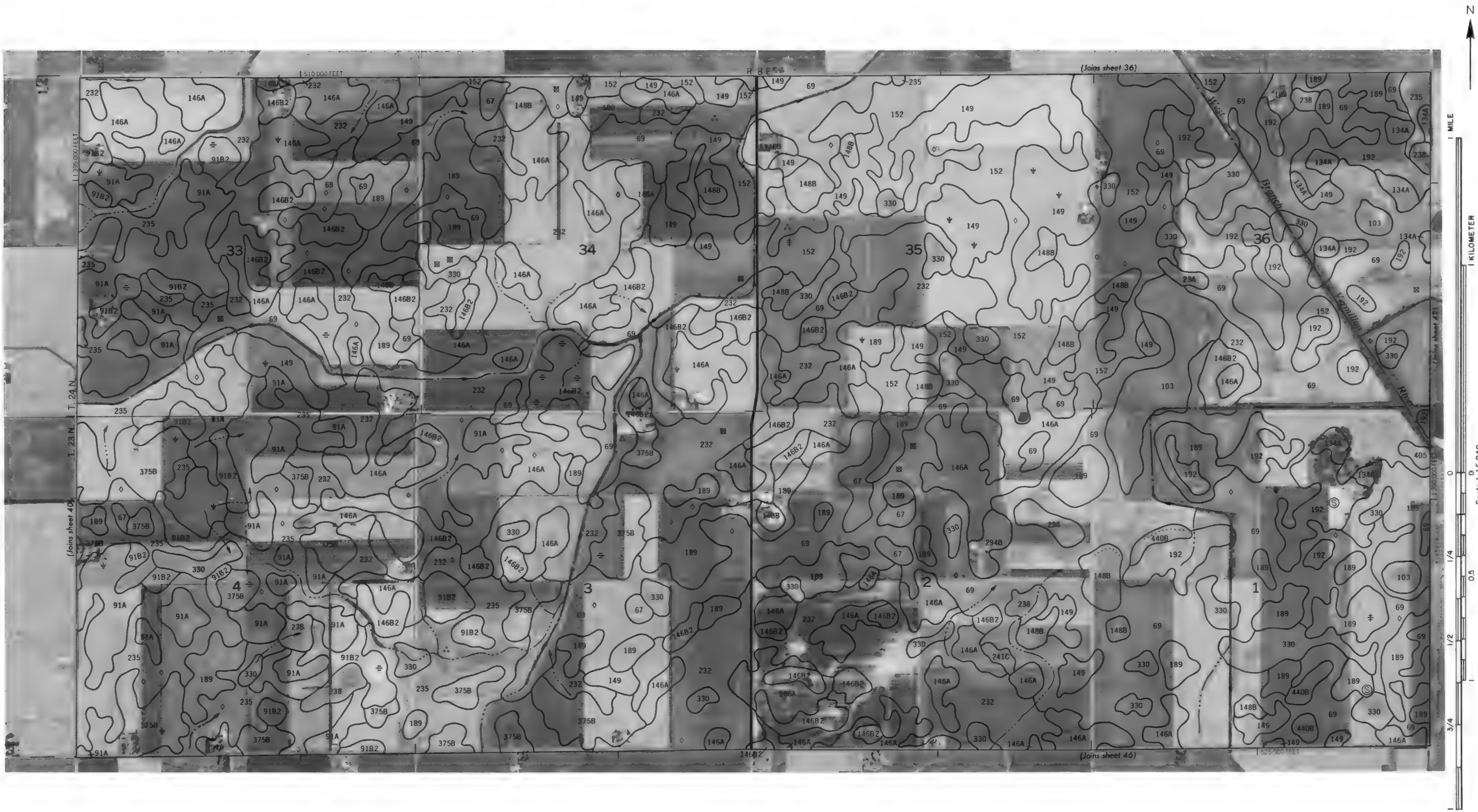
Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1



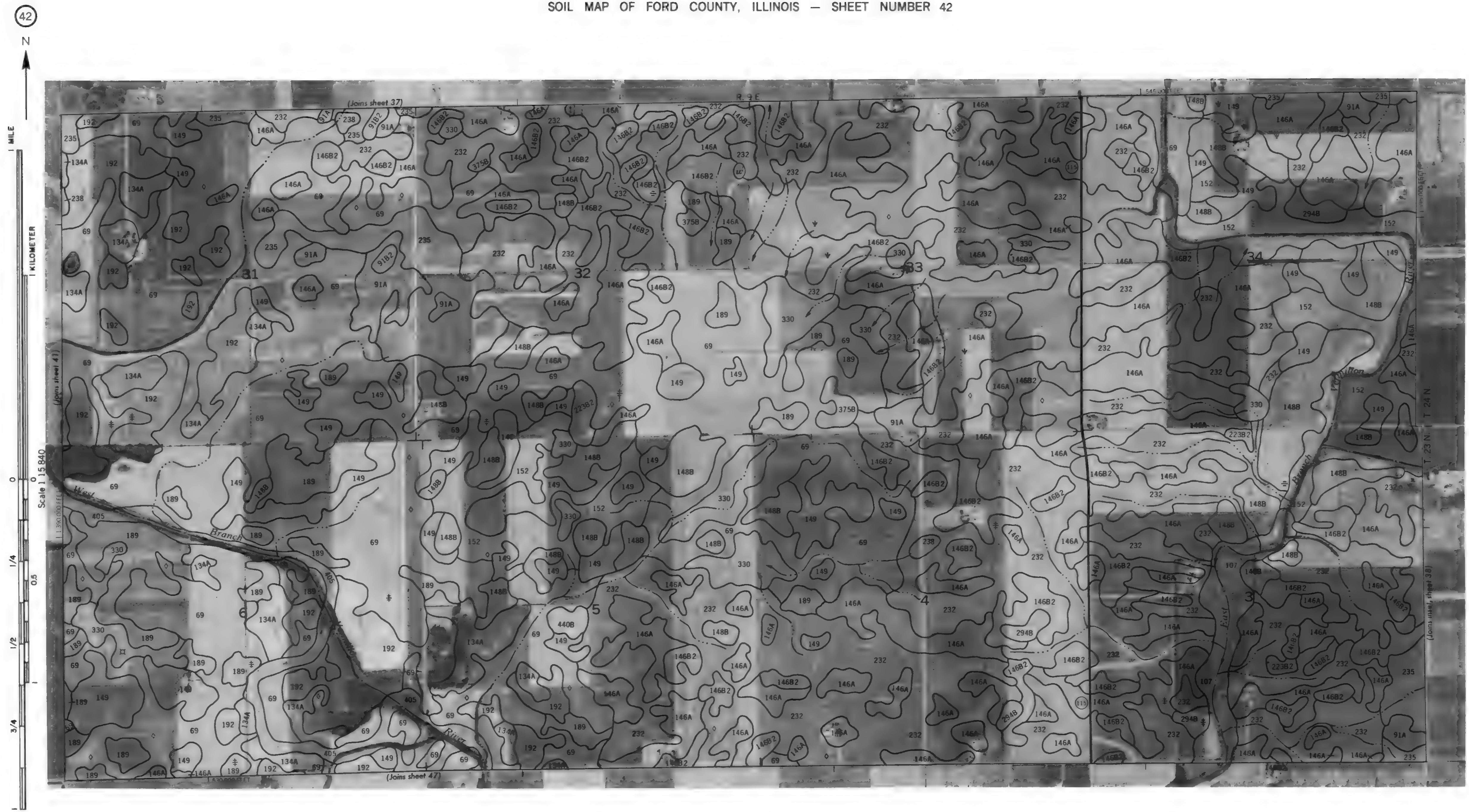
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



FORD COUNTY, ILLINOIS NO. 41

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 42

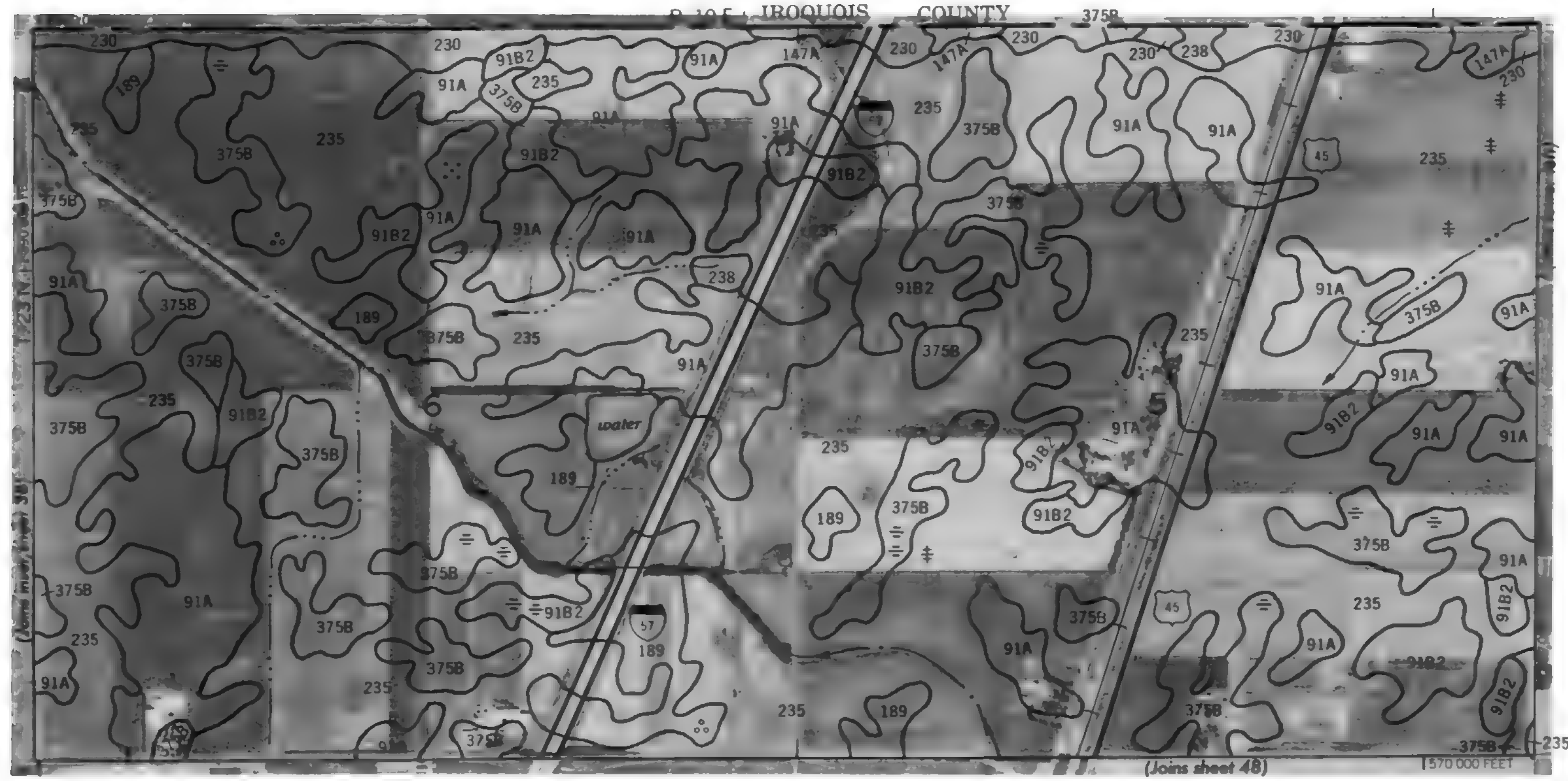


This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 42

43

N



3000 AND 5000 FOOT GRID TICKS

3000 AND 5000 FOOT GRID TICKS

1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0
0.5
Scale 1:15 840

FORD COUNTY, ILLINOIS NO. 43

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 44

N

1 MILE

1 KILOMETER

Scale 1:15 840

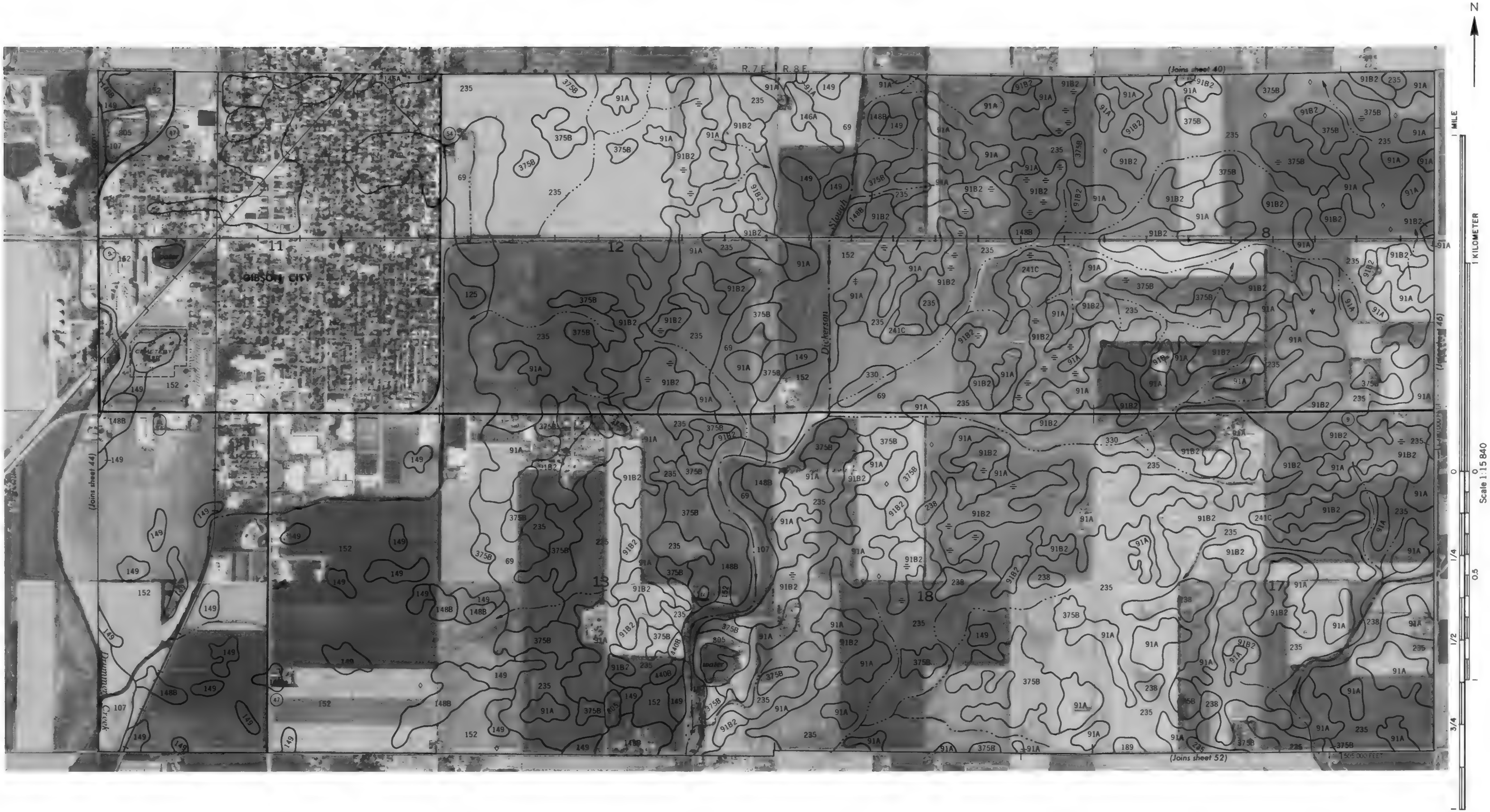
0 1/4 1/2 3/4

0 0.5

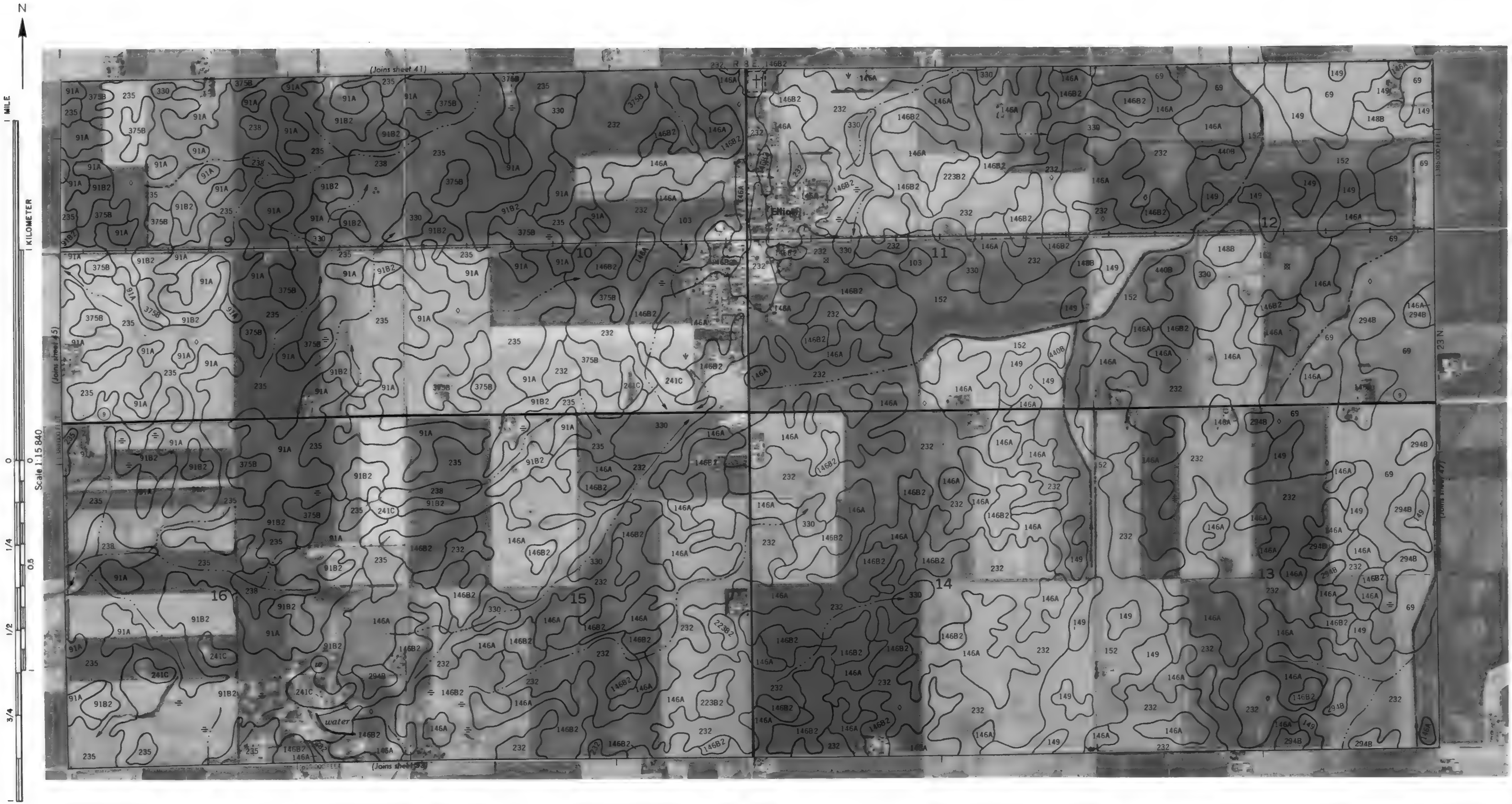
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 45

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



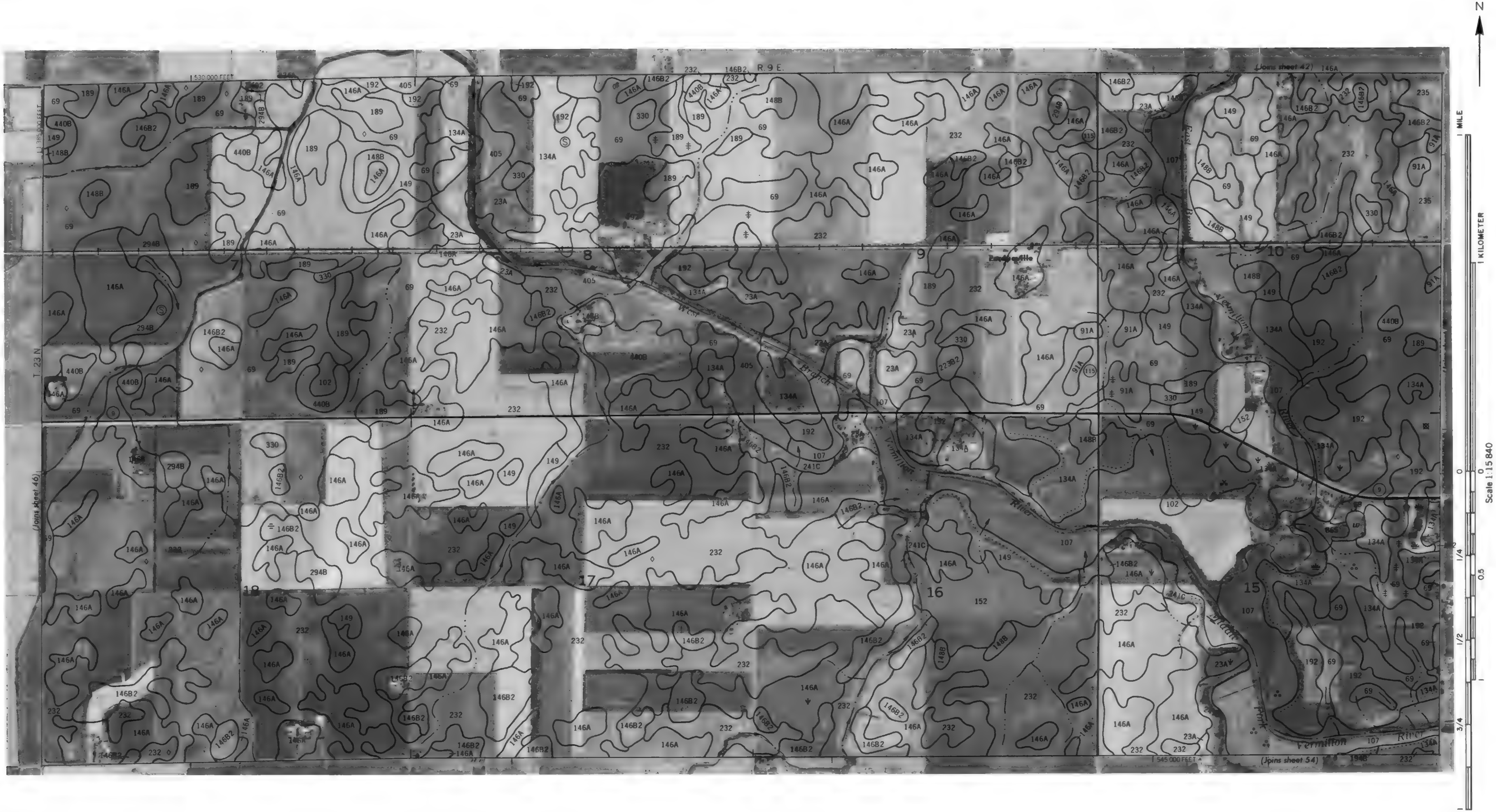
SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 46



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.

Coordinate grid ticks and land division corners, if shown, are approximately positioned.

47



FORD COUNTY, ILLINOIS NO. 47

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 48

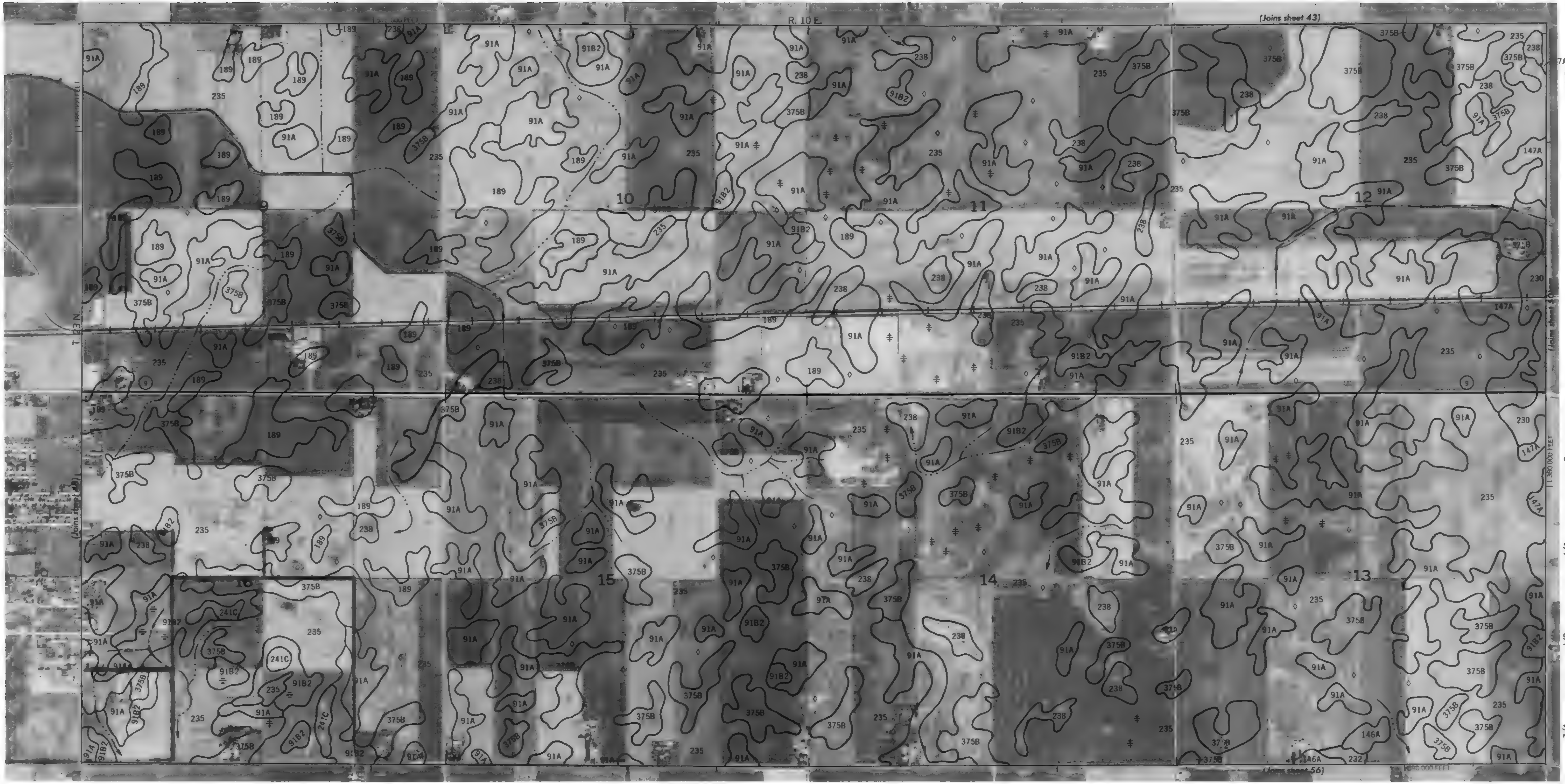
N

1 MILE

1 KILOMETER

Scale 1:15 840

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



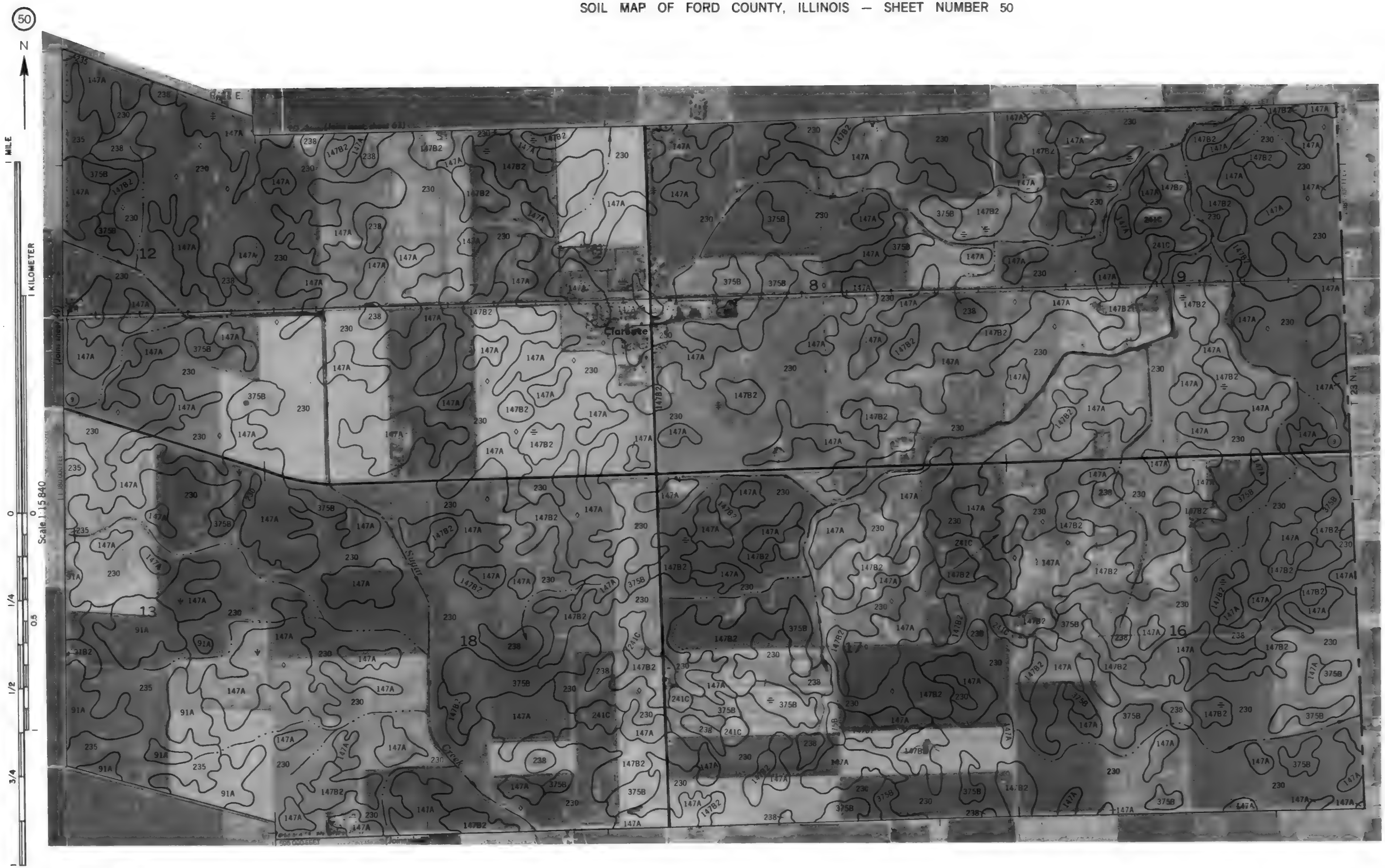
N

MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5

FORD COUNTY, ILLINOIS NO. 49

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 50



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 50

51

N

FORD COUNTY, ILLINOIS NO. 51

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

1 MILE

1 KILOMETER

Scale 1:15 840

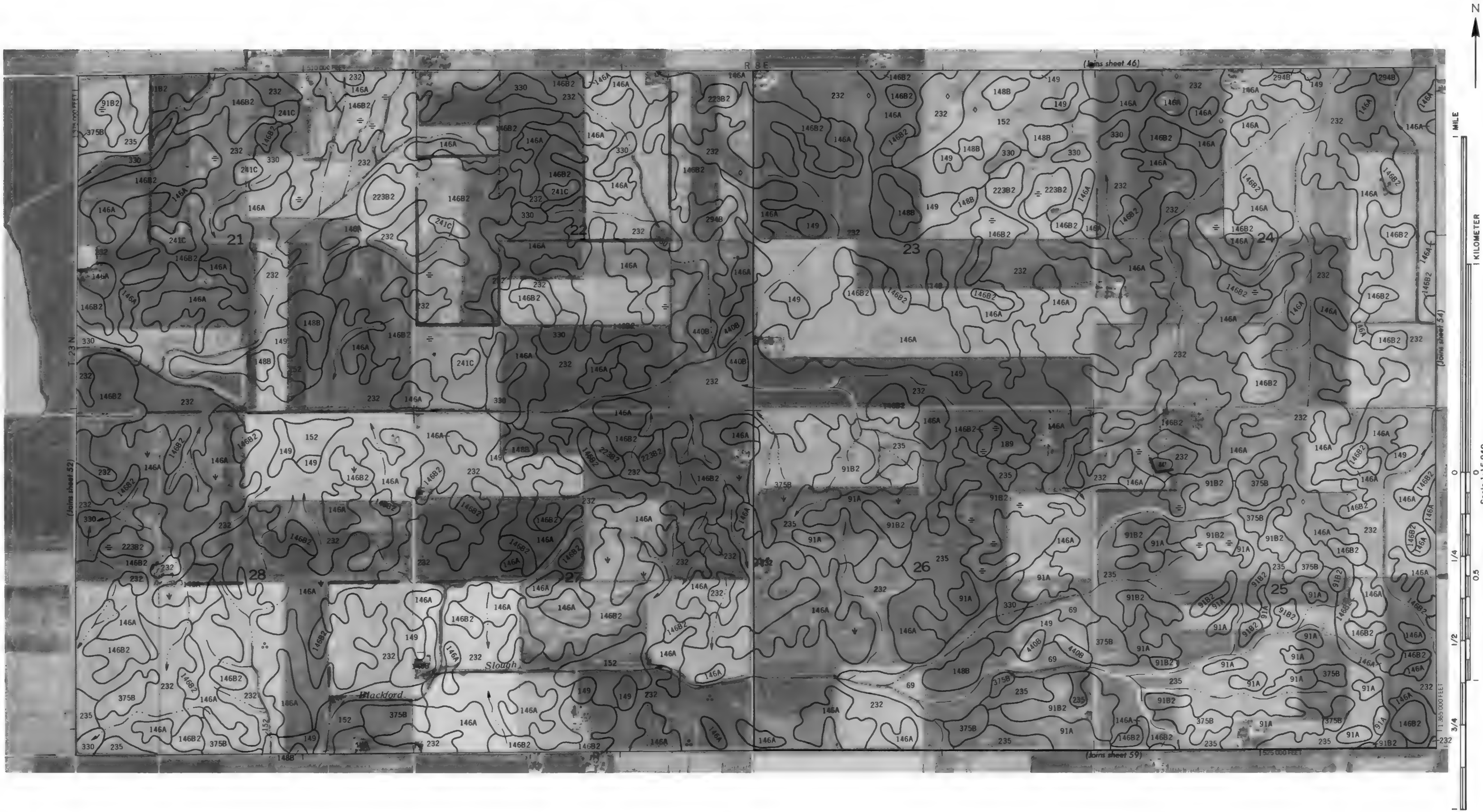
0 1/4 1/2 3/4

0 0.5

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 52

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

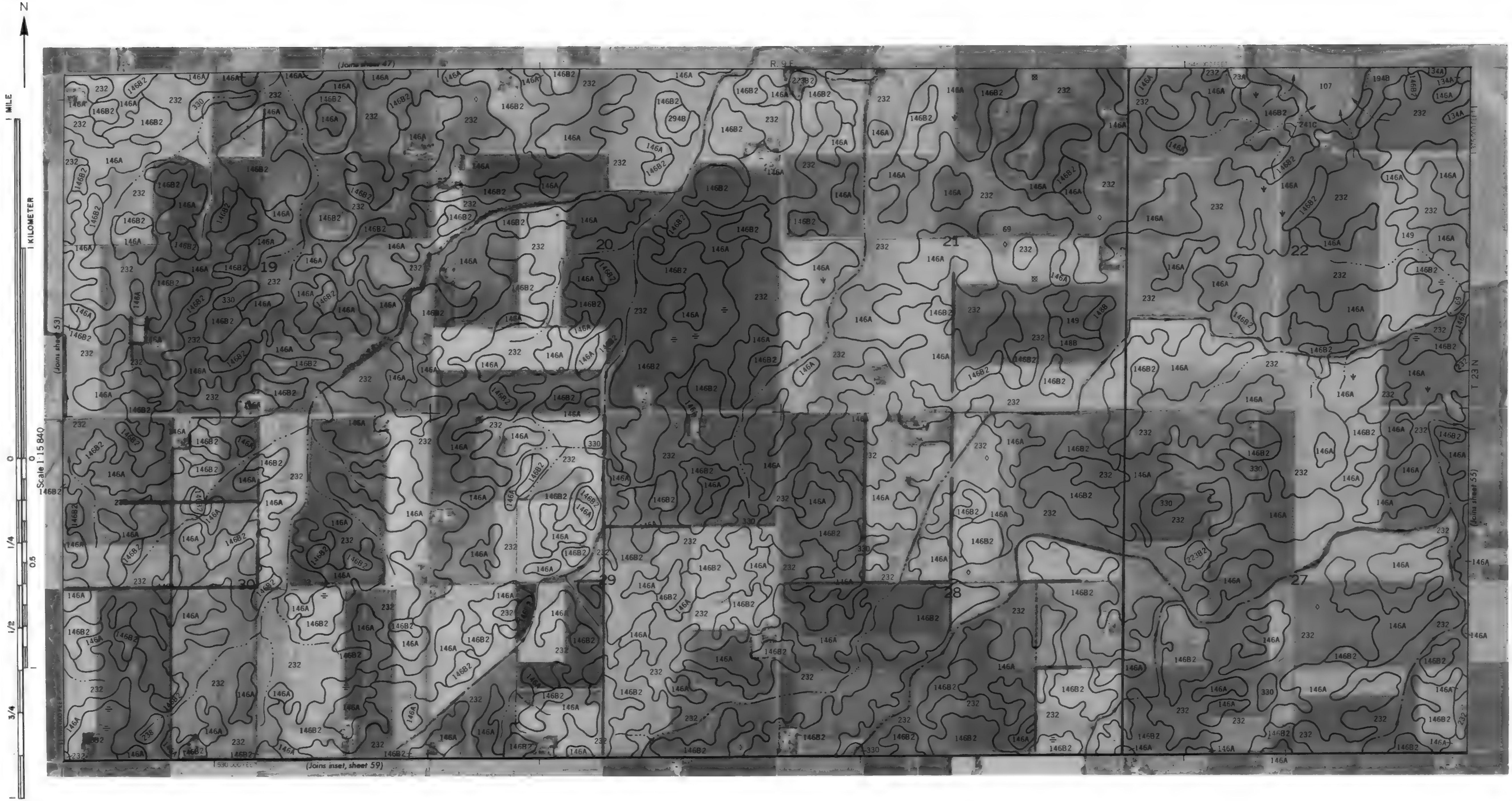
FORD COUNTY, ILLINOIS NO. 52



FORD COUNTY, ILLINOIS NO. 53

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 54



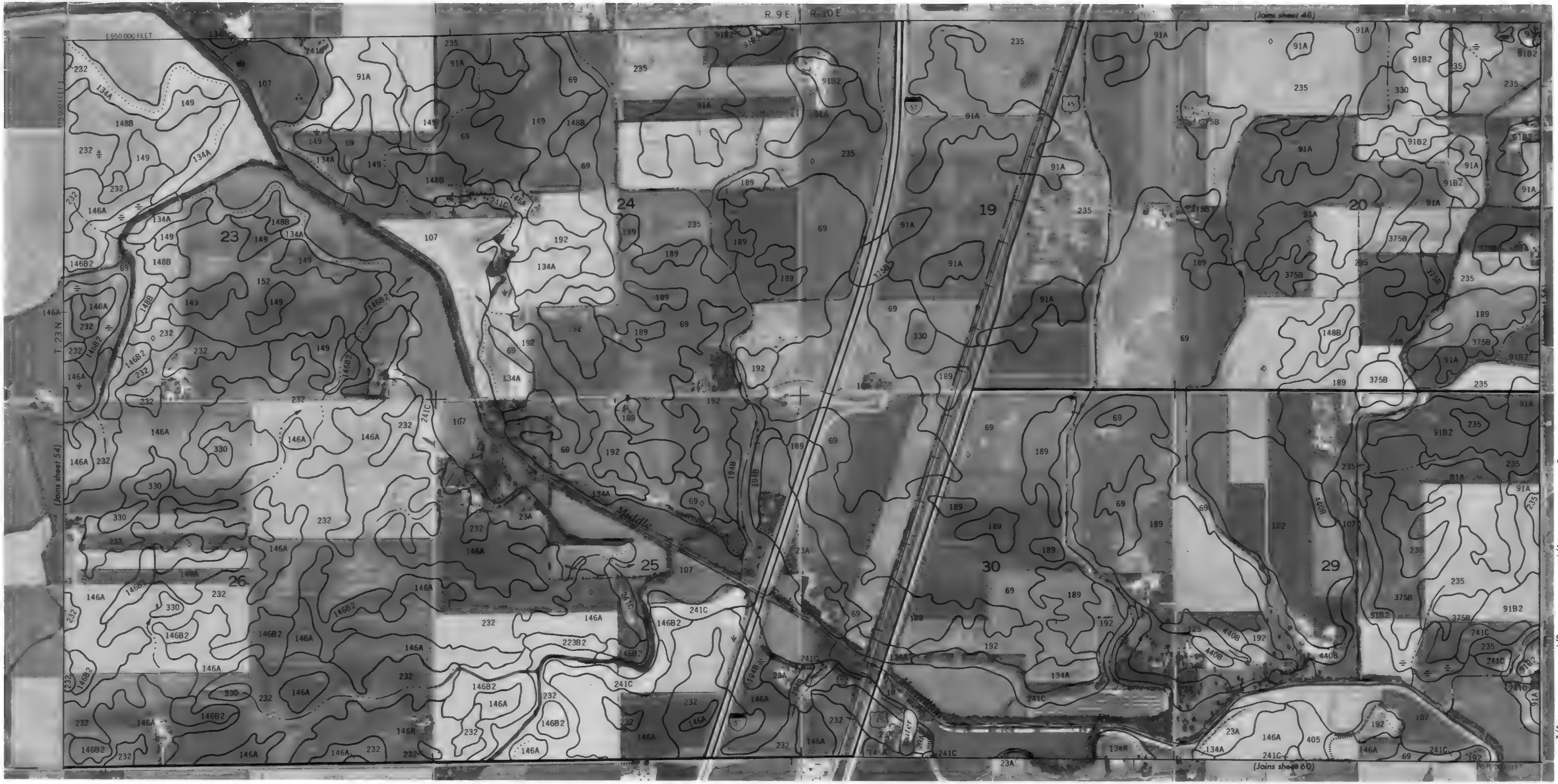
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

FORD COUNTY, ILLINOIS NO. 54

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 55

55

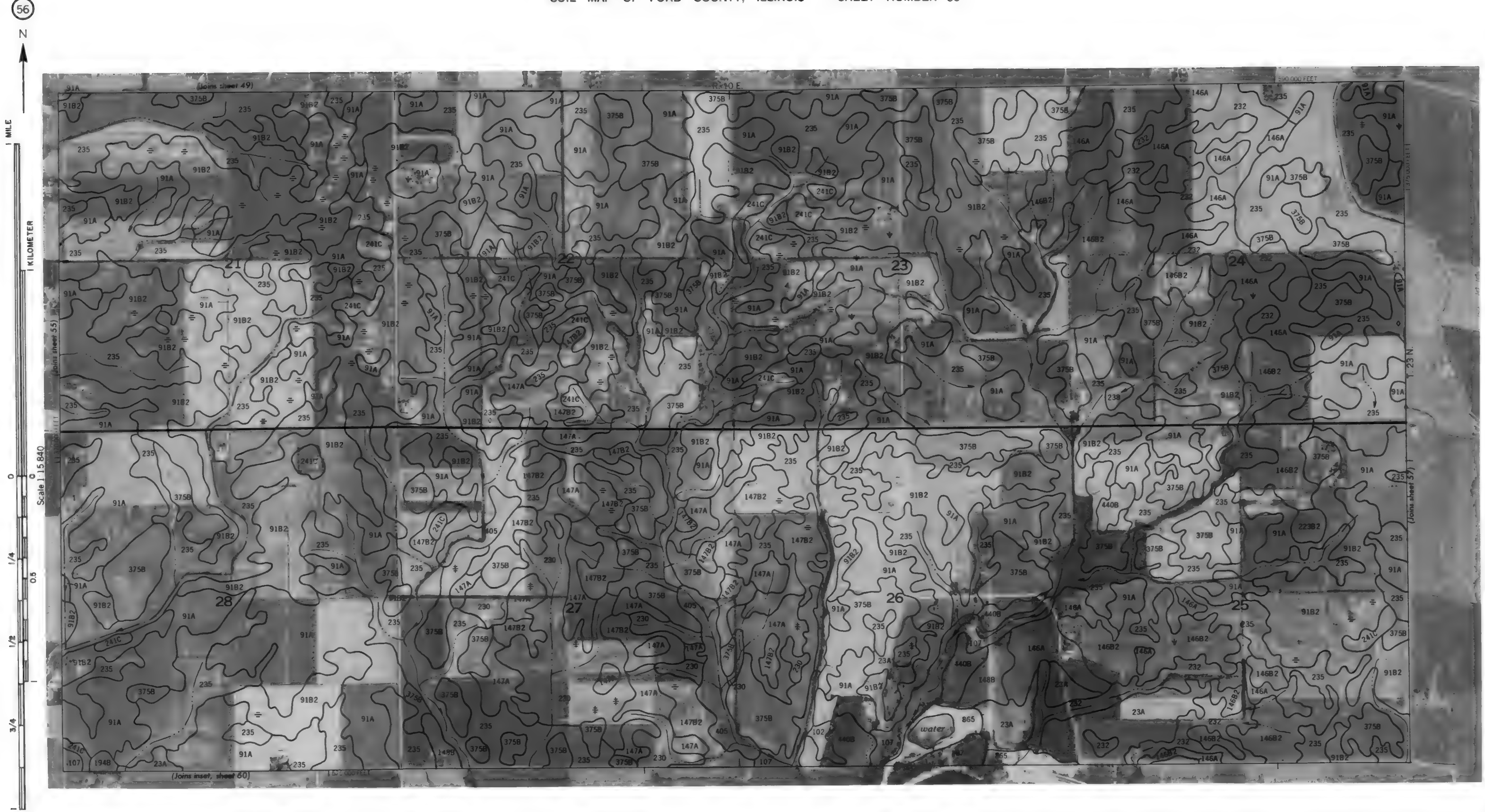
N



MILE
KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
1
0.5

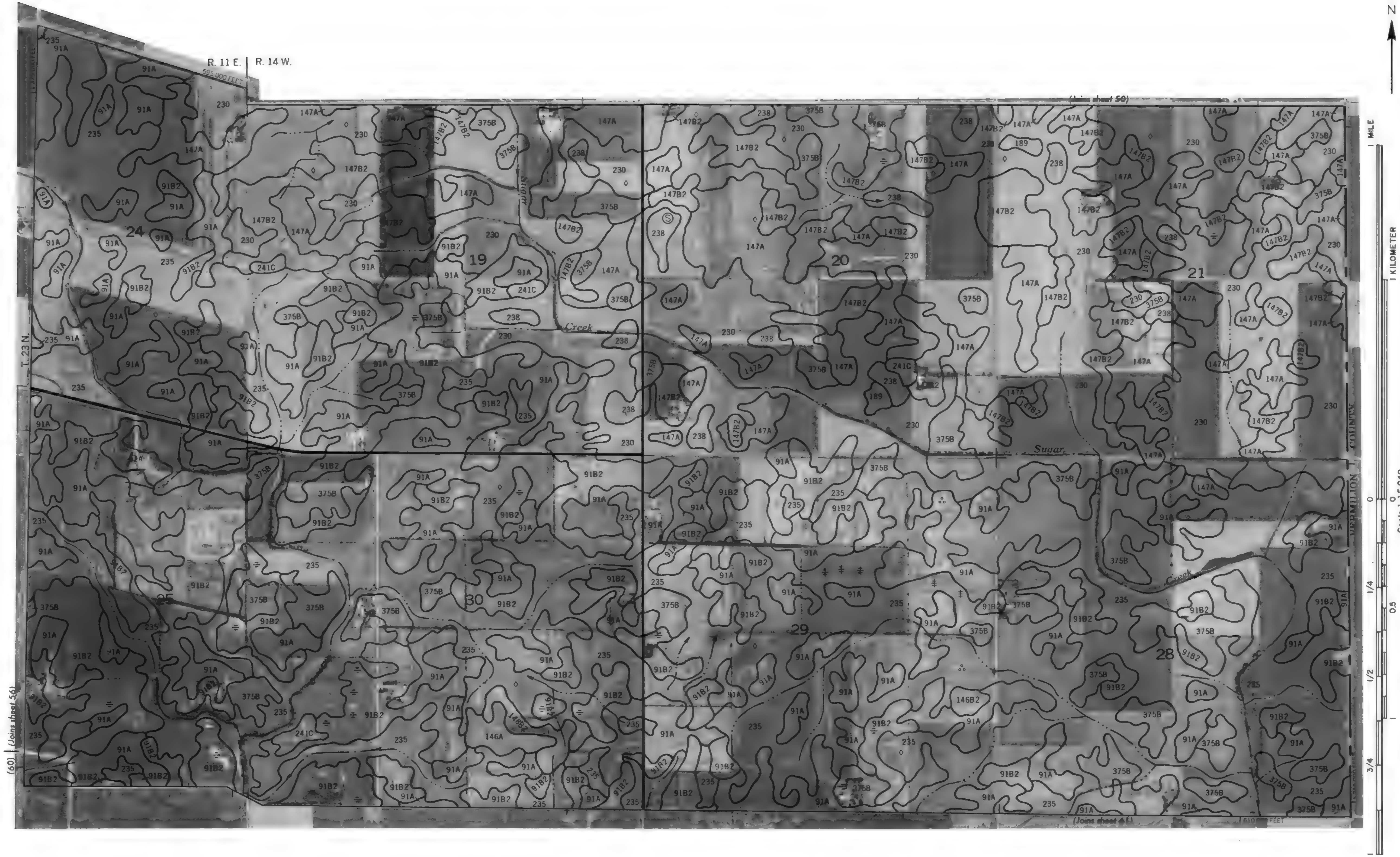
FORD COUNTY, ILLINOIS NO. 55

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

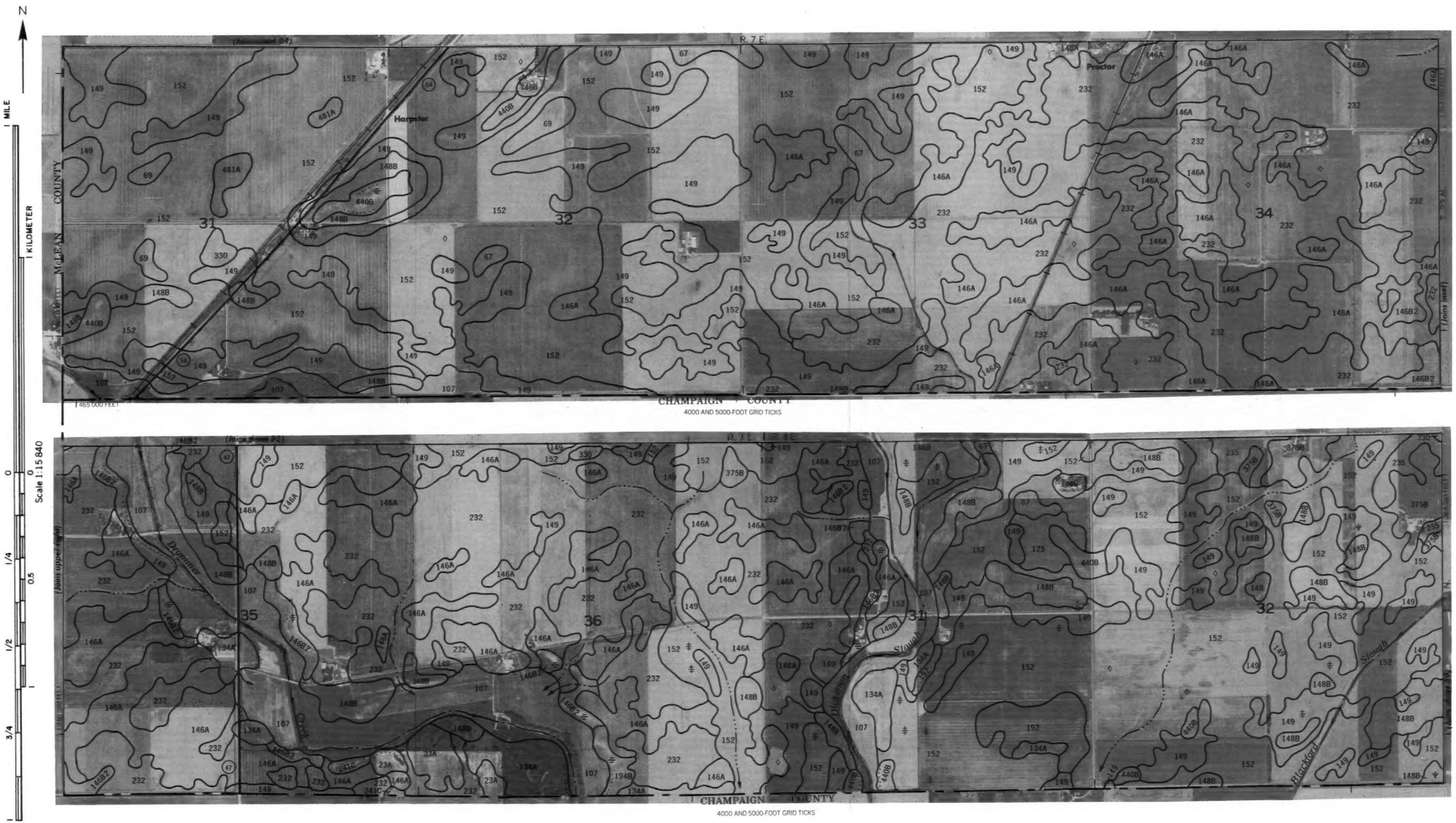
FORD COUNTY, ILLINOIS NO. 56



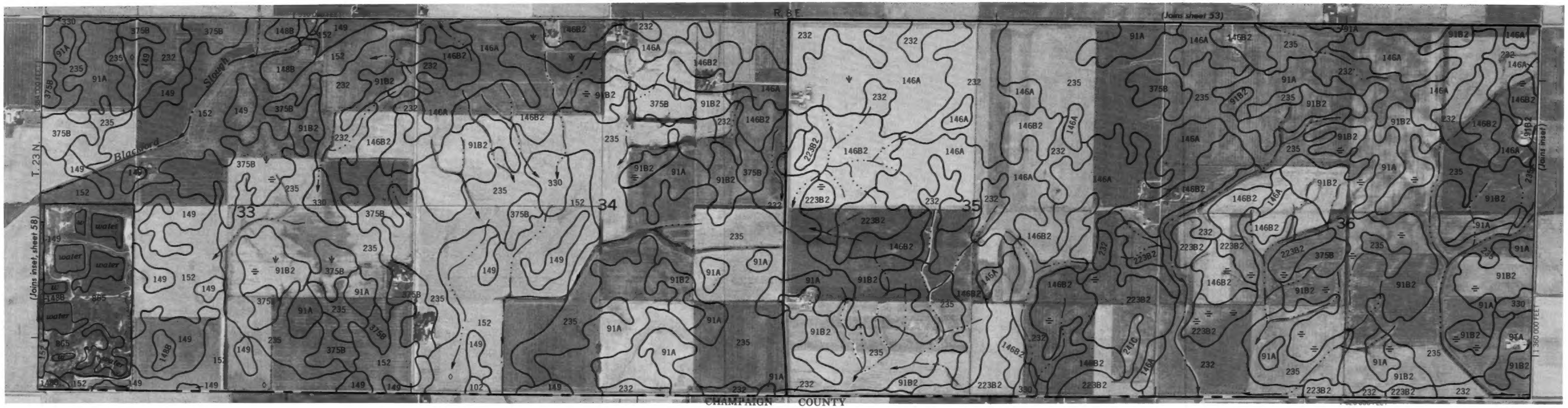
FORD COUNTY, ILLINOIS NO. 57

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 58



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



4000 AND 5000-FOOT GRID TICKS

4000 AND 5000-FOOT GRID TICKS

N

1 MILE

1 KILOMETER

Scale 1:15 840

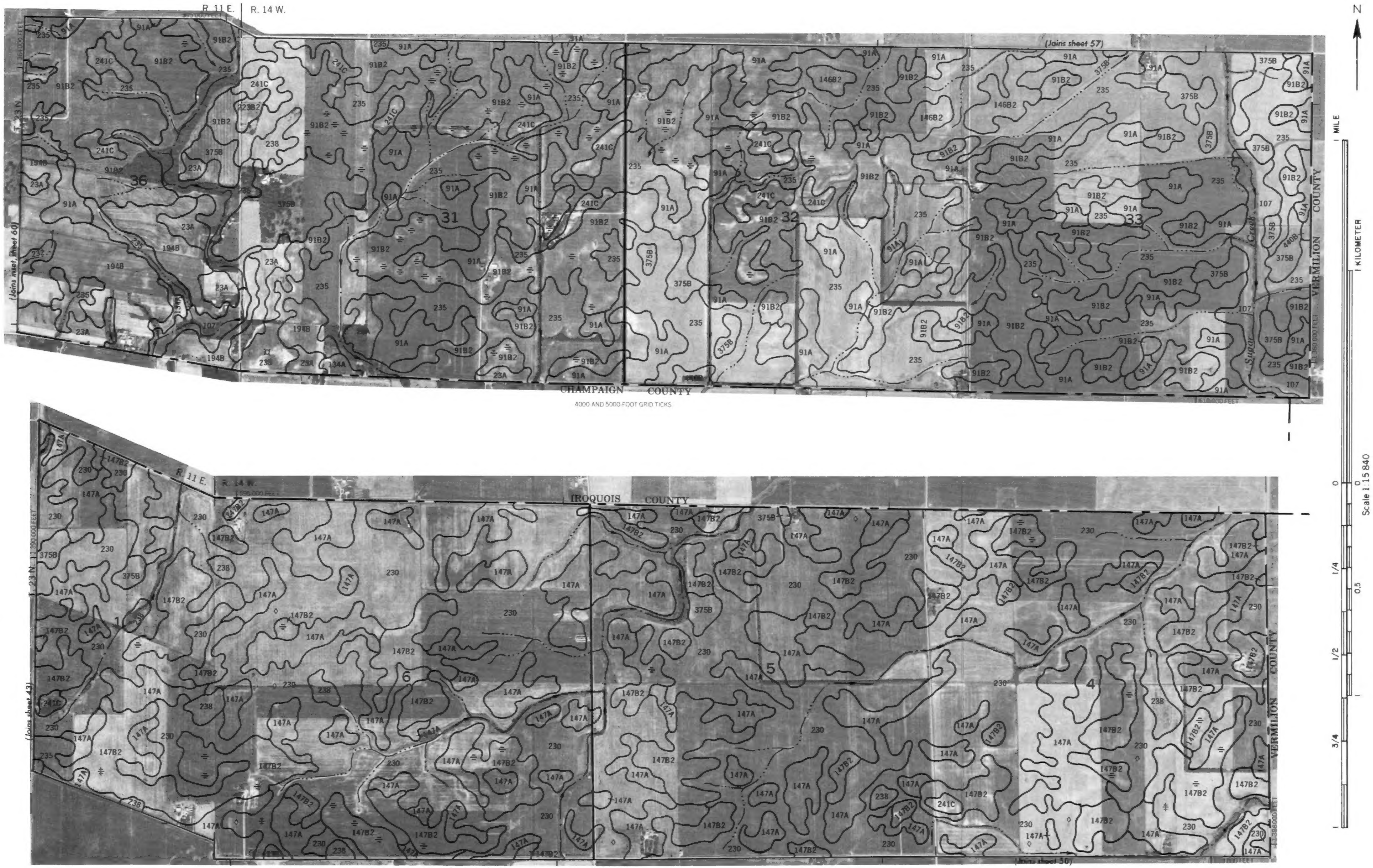
FORD COUNTY, ILLINOIS NO. 59

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 60

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF FORD COUNTY, ILLINOIS — SHEET NUMBER 61



FORD COUNTY, ILLINOIS NO. 61

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.